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Number 1

MENTAL AND PHYSICAL DEVELOPMENT

(Literature reviewed to November, 1935)

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TABLE OF CONTENTS

Chapter	Page
Introduction	2
I. The Development of Intelligence and Motor Control in Infancy ..	3
PSYCHE CATTELL, <i>Harvard University, Cambridge, Massachusetts.</i>	
II. Mental Development from Two to Twelve Years	17
LOIS H. MEEK and ARTHUR T. JERSILD, <i>Teachers College, Columbia University, New York, New York.</i>	
III. Motor Development from Two Years to Maturity	49
BETH L. WELLMAN, <i>University of Iowa, Iowa City, Iowa.</i>	
IV. Physical Growth from Birth to Maturity	54
HOWARD V. MEREDITH and GEORGE D. STODDARD, <i>University of Iowa, Iowa City, Iowa.</i>	
V. Mental Development in Adolescence	85
FOWLER D. BROOKS, <i>De Pauw University, Greencastle, Indiana.</i>	
VI. Relationships in Physical and Mental Development	102
HAROLD E. JONES, <i>University of California, Berkeley, California.</i>	
Bibliography	124

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INTRODUCTION

IN THIS ISSUE of the *Review of Educational Research* the various authors, freed from the initial handicap of bringing many years of inquiry into a presentday focus, plunge directly into a critical account of the major researches and issues of the day. At the same time some attempt has been made to consider the reader—to offer him less of a concentrate and more of an interpretative sketch.

GEORGE D. STODDARD, *Chairman,*
Committee on Mental and Physical Development.

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CHAPTER I

The Development of Intelligence and Motor Control in Infancy

The Neonate

DURING THE LAST THREE YEARS there have been a number of studies published on the activities of the newborn infant during the hospital period, the age range usually being from a few minutes or a few hours after birth to ten or twenty days of age, when the baby leaves the hospital.

Irwin (41, 42, 45) used the stabilimeter-polygraph technic which automatically records all movements made by the infant. The infant was placed on the stabilimeter for three and one-fourth hours in the afternoon between two feedings. The average number of oscillations caused by the movements of the infant was 31.6 per minute and the individual variations were enormous. The standard deviation was 31.8. One two-day-old infant averaged only 0.8 oscillations per minute while another averaged 74.7. One nine-day-old child made 10.7 movements per minute while another of the same age made 175.2 or approximately ninety times as many. The above results corroborate an earlier study in which a continuous record of four infants was kept for twenty-four hours and the average number of oscillations recorded per minute was 31.6. There was a rapid increase in motility between the first and fourth day, the average number of movements before the fourth day being about seventeen and thereafter in the neighborhood of thirty-eight. No relationship between motility and sex (45), body temperature (46), physical measurements (49), nutritional status (46), or sleep (42) was found. Pratt (63) also found no relation between sex or race and bodily activity, or between bodily activity and change in temperature between 74 and 88 degrees or change in humidity between 22 and 90 percent.

When the period of three and one-fourth hours between feedings was divided into fifteen-minute periods, there was a fairly constant increase in the number of movements from an average of seventeen per minute for the first fifteen minutes to fifty in the last fifteen minutes, an increase of approximately 200 percent. Since the hour when the greatest number of babies were asleep was near the middle of the period, Irwin concluded that the increased motility was not due to waking but to hunger contractions. Valentine and Wagner (80) found the motility of the right arm to be slightly greater than the left.

According to Irwin (47), the motility of the newborn is "mass activity" from which more restricted activities are differentiated. Taylor (22:69-81) holds that with the exception of a few structural reflex

activities infant behavior is best characterized by general activity. Dennis (19), on the other hand, is of the opinion that there are a number of different mass activities.

Aside from the studies of the spontaneous activities of the neonate there have been a number of studies dealing with responses to specific stimuli. Chaney and McGraw (13) studied the responses made to various stimuli by twenty-five infants under twenty-three minutes of age and a group of 100 infants aged one to ten days. The tendon reflexes were more easily stimulated a few minutes after birth than later, while responses to cutaneous stimuli were much more difficult to arouse in the younger than in the older group. Between one and ten days only a few reflexes appeared to be related to age. When there was a change to greater or less reaction the change occurred between the seventeenth and seventy-fifth hour after birth. It was just after this age that Irwin (41) found a marked increase in motor activity. There were marked individual differences both in the quality and quantity of the reflex responses.

Pratt (62) made elaborate studies of the plantar reflex of infants ranging in age from one to twenty-one days. He obtained 1,581 responses in the homolateral limb from 2,500 stimulations in thirteen different cutaneous areas on the foot and leg. Among these responses 185 different patterns were found. While the number of different responses appears large, according to the author it is only 3 percent of the possible number of patterns. The effects of certain physiological states are also studied.

Beasley (5, 6) stated that he found evidence of fairly accurate visual discrimination by the tenth day in all the 251 infants he studied and earlier in the majority of cases. The curve of development of the pupillary reflex follows that of the learning curves during the first five to eight days. Binocular fixation can be elicited through a significant distance range during this period. Horizontal, vertical, and circular pursuits all develop markedly during the first ten days. Squints or cases of incoordinate binocular fixation during pursuit are infrequent and certainly not typical. A special technic for studying visual ocular and color vision in the newborn infants is described. The data pointed toward the conclusion that in regard to visual fixation and pursuit the negro infants at birth were appreciably more advanced in development than the white infants. The experimental apparatus and conditions appear to have been well standardized and controlled.

Weiss (82, 83, 84, 85) found that auditory and visual stimuli reduced the activity of the newborn infant as measured by the stabilimeter in proportion to the intensity of the stimuli. The immediate reactions were responses to change; the maximum quieting effect of the stimuli was not reached until from two to four minutes. As the light was dimmed activity increased, but crying also increased. Weiss (85) stated that age, sex, and physiological factors all influenced the experimental results. Contrary to the results of Weiss, Pratt (60, 61) found that repeated

auditory stimuli increased the gross total activity of newborn infants during the period of stimulation. This increased activity was more marked when other stimuli were absent. The periods of excitation were brief and died down almost immediately when the stimulus was removed. Pratt concluded that they could not be interpreted as evidence of the "emotion of fear." When the sound stimuli were repeated at short intervals, the reactions gradually decreased. Neither change in general activity nor the pattern of activity was produced in appreciable amounts to either single or repeated visual stimuli.

Haller (34) also found that for infants between the ages of three and five weeks, tones more frequently caused discomfort than comfort and that sounds of high intensity were more disturbing to the child than sounds of low intensity. The responses were definitely related to the stimuli and usually ceased as soon as the stimulus was removed. There was no indication that the response was one of fear.

Jensen (50), using well-controlled and standardized procedures, noted the differential sucking reactions to change in temperature of the milk and to the addition to the milk of various substances. Large individual differences were found in the temperature changes which caused differential reactions in sucking, but the threshold for the same infants tended to remain constant over the period tested. No differential responses were found to acid, glucose, or water. Differential reactions were made when sucking air; all but one of the seventeen infants reacted differentially to .9 percent salt solution and all but three to a .45 percent solution.

Dockeray (23) also found wide individual differences in taste threshold. He found a few infants who always expressed aversion to an acidulated formula, a large group that reacted differentially to these formulas at irregular and unpredictable times, and a third group that always reacted as to the regular formula. The superimposed order of the regular formula or of previously avoided foods did not affect the feeding reactions.

Disher (21), in a study of ninety-one infants' reactions to substances of various odors placed in the nose, found large variations in reactions both from one individual to another and from the same individual from day to day. No sex, race, or age differences could be demonstrated.

Other studies of the reactions of infants during the first ten days after birth that have been reported during the last three years deal with the latent time of body startle or the Moro reflex and the infant's response to vertical dropping movements by Irwin (43, 44); smiling and posture during nursing and defecation by Dennis (18, 20); reaction time by Stubbs and Irwin (74).

Dennis (16), after a study of the literature, presented a list of all responses of newborn infants "which are known at the present time together with available information concerning their stimuli." Gilmer (32, 33) developed a much shorter classification of nine spontaneous responses plus a few isolated movements based on moving pictures and

one hour observation periods between the ages of one and ten days. He included crying, stretching, sneezing, mouthing, yawning, open mouth, chewing, sucking, smiling, and a few isolated movements. Regarding his classification, Gilmer wrote: "By no means has the above classification been 'selective'; all behavior which occurred has been included."

A more complete review of the literature on the experimental studies of the newborn infant was made by Hurlock (39) and by Richards and Irwin (65). Whether or not such studies as those reported above on the reflexes and spontaneous activities of the newborn infant are dependent upon or are related to the development of intelligence and motor control has not been proved. It is quite possible that if the development of motor activity and intelligence of these infants was followed into later childhood some of the activities of the newborn would be found to be correlated with later development, but as yet no such follow-up study has been made.

General Development

Several investigators have published detailed, running accounts of certain types of behavior development based on observation periods of stated lengths at stated intervals. Bridges (8, 9, 10) was especially interested in the social and motor development between birth and two years of age; Dudley, Duncan, and Sears (25) in motor development between fifty-eight and sixty-seven weeks; and Kelting (53) in eating, sleeping, crying, and social behavior under ten months. Another method of depicting development of behavior at different ages in different situations is the moving pictures that have been put out by Gesell (28), Valentine and Wagner (80), and Kellogg and Kellogg (52).

Shirley (69) presented an intensive study of the mental, motor, and social development of twenty-five infants followed from the day of birth until two years of age. The infants were examined both by a pediatrician and a psychologist every day during the first week in the hospital, every two days during the second week, every week during the first year, and every two weeks during the second year. The psychological examination consisted of a series of test items compiled by the author. Since the tests were given in the homes they were of necessity somewhat less formally presented than is the usual intelligence test. The items were not scored plus and minus during the examination, but a descriptive record was made of the child's responses to each item and of all other behavior of the child during the half-hour examination, whether or not the activity was in connection with a test item.

An analysis of the mass of data which was collected, together with a study of that reported in the literature, led the author to the following conclusions (70:254):

A consistent sequence of motor items unrolls at varying speeds but in an unvarying order that is little influenced by specific training or by divergent environmental

factors. The unfolding of motor skills proceeds in accordance with biological laws. The chief one is the *law of developmental direction* or the anterior-posterior growth law. A second law is that of *priority of the flexor muscles over the extensors in strength*. A third law of neural and muscular action that may be operating in cases of sudden integration of motor skills is the *all-or-none law*.

The number of cases in Shirley's study is small, but the consistency with which each baby's development follows the sequences described lends weight to her conclusions. Consistent sequences were noted not only in the development of motor control but also in the development of social reactions and speech.

Among others Irwin (48) and Thompson (76) offered additional evidence of the head-downward or anterior-posterior sequence of development.

Shirley (69: Vol. II, 399-400) is of the opinion that in addition to the gradual behavior growth there emerge new types of behavior which are just as truly a phase of development as the improvement of behavior already present. She stated:

When we compare the small number of abilities of the newborn child with his large repertoire of acts at two years, we realize what a vast number of new behavior items have emerged in the interval. It is hardly possible that this great development has been solely the improvement in and reorganization of behavior items already possessed.

The largest volume of work on infants has come from Gesell's laboratory at Yale University. Gesell, Thompson, and Amatruda (30) presented their results based on 524 developmental examinations obtained from 107 infants between the ages of four and fifty-six weeks. A number of the infants were examined at intervals of four weeks throughout the period of the study. The general situations, materials, and procedures used were more strictly standardized, but otherwise similar to those described in Gesell's earlier books (29). Some twenty-five situations and the babies' responses to them are described in detail. Tables are presented which give the percent of babies at each age which made each response. For example, the situation for which the greatest number of responses are listed is one in which the infant is sitting before a platform with a hand bell placed directly before him. Seventy-eight responses are listed and the percent of babies making each response at each age interval is given. There are eight situations for which over fifty responses are recorded. Accompanying this volume is a two-volume atlas (26) which includes 3,200 analytic action photographs. Volume I is arranged to show the normative behavior development in twenty-four different situations. Volume II shows the development of the child in its normal home environment—eating, bathing, playing, sleeping, etc. The value of the cinema records for the study of behavior is described both in the atlas and in a separate article (27).

The Development of Grasping

Several articles and monographs using the above described data have come out from the Yale laboratory. They all appear to have been done under carefully standardized conditions and are mostly reported in great detail.

Halverson (36) described the development of the infant's ability to pick up a one-inch cube. The regard given the cube, the method of approach, and the method of grasping are described for each age level. Two, three, or more pages are given to each of eleven methods of approaching the cube; this is followed by the methods of grasping, of lifting, and of disposing of the cube. Another article (37) followed, describing the methods used by the infant in different stages of development of grasping objects of different shapes, and a third study by Halverson (35) dealt with the reaching and picking up of small objects.

Castner (12) also used the data from Gesell's clinical studies and described the development of fine prehension from transient regard through prolonged regard and occasional attempts at grasping to final success. In progress toward skill the development of the actual grasping in the infant passes through palmar prehension, scissors closure, and finally an overhand pincer-like prehension. During this period reaching progresses from a round semicircular reach with frequent misses to a straight direct reach with no fumbling.

Conditioned Responses in Infancy

The youngest age at which an attempt at conditioning has been reported is that of Ray (64) who attempted to condition the fetal movements produced by a loud sound to a vibration against the mother's abdomen. The results were not reported.

Marquis (58) was successful in conditioning sucking movements to the sound of a buzzer in infants as young as five days. These experiments were performed under carefully standardized conditions and with adequate controls.

Kasatkin and Levikova (51) established sucking movements in response to a light stimulus in six infants at about the age of two months. Though the age at which the experiments were begun with the different infants varied from fourteen days to one month and seventeen days, the conditioned response was established in all the infants at approximately the same age (range seven days). Thus the formation of the conditioned response appeared to depend more on the maturity of the infant than on the amount of training. By the end of the fourth month, sucking movements had been conditioned to a green light and inhibited to a yellow light in five of the six infants.

Wenger (86) conditioned blinking to a light in the newborn infants, to the Hull tactual vibrator, and the responses to an electric shock to

a tone. Conditioning first occurred on the seventh day. There were two control groups for each experiment.

Bregman (7) was unsuccessful in her attempt to condition the emotions of infants eight to sixteen months of age to objects that were of little interest to the child. She used wooden forms and colored curtains as conditioned stimuli, a startling electric bell as an unpleasant unconditioned stimulus, and a toy and pleasant tone as pleasing unconditioned stimuli. The experiments do not appear to be sufficiently extensive or well controlled to warrant her rather sweeping conclusions (7:196):

Changes in emotional behavior, in attitude and interest, are not, as a general rule, at least, readily brought about by joint stimulations in early life, and that conditioning *per se* cannot be accepted as a cover-all explanation of the emotional modification which takes place during that period.

Color Discrimination

Staples (72) mounted a colored and a gray disc of equal brightness on a gray background of the same brightness and saturation as the gray disc and held them before infants who were between three and five months of age for two minutes. How the infants distinguished between the gray disc and the gray background of equal saturation and brightness was not made clear, but Staples reported that the infants fixated on the color for an appreciably longer time than they did on the gray disc. There was no reliable difference in the time of fixation of the four colors used.

The older infants, between six and twenty-four months, were asked to "get the prettiest ball." The percent of infants who reached for the color as distinct from any other response rose from 50 percent at six months to 90 percent at eighteen months. There was no further increase between eighteen and twenty-four months. When two of the colored discs were mounted on the gray background there was evidence to indicate that the children probably distinguished between the colors at twelve months and unquestionably did so by fifteen months. Red was definitely preferred to any other color at all ages, yellow was preferred to blue or green, and blue to green. With the exception of blue there was a definite tendency for the color preference to become less marked with increase in age.

Form Discrimination

Skeels (71) studied form perception in eight children between the ages of eighteen and twenty-four months. He hid a toy under one form of a four-hole form-board and asked the child to find it. All the children learned to go directly to the correct form. At the beginning, the end, and in the middle of the training period, the subjects were asked to place the forms in the form-board. No child succeeded in purposefully placing the forms or appeared to have profited by the period of training.

The form under which the toy had been hidden was not placed any more frequently than the other forms.

Constancy of Mental Development

For the purpose of determining how consistently a baby held his relative position in the group, Shirley (69) converted the scores made on her tests into percentile ranks within the group, into the percent of the median, and into the percent of the highest score. A number of growth curves were plotted. In spite of the markedly consistent sequence of development, there was found a markedly inconsistent rate of development, especially during the first year or year and one-half after birth. Three general characteristics of the growth curves were noted: (a) an irregular rate of growth during the first year; (b) a settling down to a more steady rate the second year; and (c) a slowing down of the rate of growth with age.

Over short intervals of time the correlation coefficients were fairly high, varying from .16 to .96 with only two below .50, but at longer intervals of ten or more weeks the coefficients hover around zero, averaging $-.006$. Similar figures were obtained when the Gesell schedules or Minnesota preschool tests were correlated with Shirley's tests. The curves of development and the correlation coefficients between motor, vocal, and social development give further evidence of the inconsistency in the rate of development in the various types of behavior.

Bayley (1, 3), using a scale based largely on items from Gesell's schedules but also including some items of her own and some from other sources, reached conclusions similar to those of Shirley in regard to the inconstancy of mental test ratings. She found no significant relationship between the scores made by infants under fifteen months of age and those made at three years. This was true even when the infant test scores for three successive months were averaged. Bayley stated:

This series of correlations, with remarkably consistent trend, shows that, though the children remain relatively stable in their scores over short periods, their position in the group is liable to great variation over longer age intervals . . . (3:47).

The findings show that the tests are measuring different functions, or groups of functions, at successive age levels, rather than, as has been often supposed, a unit function of intelligence which extends throughout life. . . . A selection of half of the tests, through fifteen months, which seemed to be more truly "mental," gave no greater consistency in scores than did the discarded half (3:84).

The test of Bayley had reliability coefficients for the several months obtained by the split-half method and corrected by the Spearman-Brown formula that ranged from .50 to .95, and between tests given a month apart the correlation coefficients averaged slightly above .80. The number of cases at each age level was approximately fifty.

Shirley (69:Vol. II, 440) offered the following as a tentative explanation of the inconsistencies of mental development during the first year after birth:

Inconsistencies in first year development may be attributed to the great speed of development, to the catching up of premature babies and the slowing down of post-mature babies in developmental rate, and to the difficulties of motivating babies and of reducing unfavorable personality traits to a minimum. Finally it is suggested that it is impossible for the baby to settle down to a consistent rate of development until a sufficient number of traits have emerged to serve as a foundation for future skills. Fixity and consistency apparently are end points rather than starting points in behavior development.

The studies of Gesell (29) and Bühler (11) led them to conclusions opposite from those of Shirley and Bayley, namely, that mental growth proceeds at a regular rate from early infancy and that the trend of development in infancy can be determined with sufficient accuracy to be of value in predicting future mental development.

Cunningham (14), using the Kuhlmann extension of the Binet tests, found considerably greater consistency of results between one age and another after one year. Thirty-seven cases who were tested at the ages of twelve, eighteen, and twenty-four months were also tested at the age of eight years with the Stanford-Binet. The correlation coefficients were .55, .42, and .24 respectively. Driscoll (24), using the same data, found correlation coefficients of .69 between the age of twelve and eighteen months, of .76 between eighteen and twenty-four months, and .58 between twelve and twenty-four months. These coefficients are not high, but are far above the zeros reported by Bayley and Shirley for slightly younger infants.

Symmes (75) also found a considerable amount of consistency. Unfortunately, she grouped the results from the infants with those from older preschool children and also considered such factors as environment and the family background when making the ratings. It is, therefore, difficult to determine the significance of the constancy reported.

When Thurstone's method of absolute scaling was applied to Bayley's data, a mental growth curve was obtained that showed rapid growth with increasing increments up to ten or eleven months. After fifteen months the rate became almost constant. The growth of motor ability showed increments during the first twenty-one months which were larger than the mental growth increments for the same children. The rapid growth was followed by rapidly decreasing increments. The correlation between the adjacent motor tests were fairly high, but over longer periods were only slightly higher than those found between the mental tests.

Steckel (73) plotted the growth curve of infancy by Thurstone's method of absolute scaling, using all the items in Gesell's schedule which were found at two or more age levels. Contrary to Bayley's results, she found the curve to be negatively accelerated as early as the fourth month before birth.

The Effects of Environment and Training on Development

The studies on the relationship of environmental factors to mental development in infancy are unsatisfactory, as are those on older children, on account of the difficulty of separating the effects of environment from those of heredity. Vance and others (81) compared the mental development of small groups of infants in professional homes, labor homes, boarding homes, institutions, and college management homes. The average I.Q.'s ranged from 118 in the professional homes to 88 in the institutions, but no attempt was made to separate the effects of heredity and environment.

Ripin (68) compared the mental development, as measured by test items selected from the works of Gesell and Bühler, of infants in institutions with those in homes of low socio-economic status. The two groups showed no difference up to the sixth month, but from seven months on the private home group made the better ratings. The greatest differences were found in the postural, language, and "mental" items; the smallest differences in the emotional, manipulative, and social items.

Bayley (2, 3) was unable to find any environmental factors which showed any relationship to intelligence during the first eighteen months of infancy; the correlation coefficients were slightly but not significantly negative. The same was true in relation to the education of the parents. After twenty months of age the coefficient between the education of the parents and the intelligence of the child rose to .50; that between intelligence and socio-economic status also rose with age but remained below .30.

McGraw (57) gave special training to one of a pair of twins and kept the other for a control. The twins at birth were thought to be monozygotic, but were not proved to be so. Beginning at the age of twenty days the twins were brought to the laboratory for seven or eight hours a day, five days a week. One twin was stimulated at regular intervals to those activities of which he was capable. As development advanced he was stimulated to more and more advanced activity. The control twin was left quietly in his crib, was allowed no more than two toys, and aside from his routine care received little attention. The purpose was to study the growth of particular behavior patterns and to determine the influence of exercise or use of an activity upon its development.

Both the control and the experimental twin were put through motor activity tests every two weeks to determine their developmental stage. The conclusions reached were that exercise in activities which were necessary for normal development were influenced little if at all by practice. These include the early reflexes such as grasping and the startle reflex, and activities such as crawling, walking, reaching, prehension, etc. (Both twins started walking at approximately the same time.) Other activities that are not necessary for normal development, such as swimming, climbing, skating, jumping, etc., were greatly influenced by practice. Before the end of his twenty-two months of systematic, daily training, the experimental twin showed remarkable skill in these activities.

In the meantime the control twin was left to his own devices in his crib, but at twenty-two months he was given two and one-half months of intensive training. Except in tricycling, the control twin's activities were, at the end of his training period, still inferior to those which the experimental twin had reached after the same amount of training at a younger age.

McGraw explained the differences in ability as the result of the "acquiescent attitude" developed through training in the experimental twin and to the starting of training at just the right stage of development. The control twin could never be made to jump from a pedestal to the floor even from a height as low as $7\frac{1}{2}$ inches, or from a higher pedestal into the waiting arms of the experimenter. This is explained on the ground that before training was begun he had developed the perception of height which had not yet been developed in the experimental twin at the time his training was begun and that he, therefore, was less cautious. On the other hand, the experimental twin's inferiority on the tricycle was explained on the ground that he was put on the tricycle before his ability was sufficiently developed and that as a result he lost interest.

At the age of twenty-four and one-half months both twins were given systematic training in activities that were very different from those in which they had been previously trained, namely, acquiring a lure through the manipulation of sticks and strings. In these activities the experimental twin, except for somewhat greater persistence, showed no superiority over his control brother.

During the month of training in perception and manipulation, the twins did not see any of the gross motor activity apparatus. At the end of the month Jimmie made his best performance in practically every situation wherein he had previously been exercised, while the experimental twin showed an obvious though temporary deterioration in practically every performance. The explanation given was that the control twin had gained in cooperativeness and in acquiescence during the month of training in manipulation, whereas the experimental twin had been completely cooperative before. When the twins were brought in for a check-up a few weeks after the close of the experiment, the control twin had returned to his former uncooperative attitude; the experimental twin had retained the cooperative attitude he had held from the beginning.

McGraw is of the opinion that the greatest effect of the differential training was the development of an attitude of acquiescence in the experimental twin.

A book has been written on growth and child psychology based on these experiments. To the reviewer these experiments are of great interest in showing the remarkable motor skills that may be developed in infancy through appropriate systematic training. Before the age of twenty-two months the experimental twin was able to climb a 70 degree incline and slide down, stack boxes to attain an object beyond his reach, roller skate, coast down an incline of 4.5 degrees on skates and turn a corner, let him-

self off a stool $63\frac{1}{4}$ inches in height, and find, as they were called for, eight objects which he had hidden the day before. But it would seem that the results of these experiments might better be used as illustrations rather than a basis for the author's theories, for after all there was only one experimental subject and one main control and whether or not the twins were monozygotic is uncertain. (There is from time to time mention of a control group, but no information regarding it is given.) No mental tests were made on the infants until the end of the twenty-second month. At that time there was no significant difference in the I.Q.'s obtained.

It sounds reasonable to attribute the experimental subject's cooperative attitude to his intensive training, but it would be just as reasonable to attribute the control twin's uncooperative attitude to the so-called "inferiority complex" developed through association (at home) with his much trained brother. The control twin's refusal to jump from a pedestal may have been the result of a well-developed perception of height, but there is no evidence to show that it was not the result of a past bruise and lack of confidence in the experimenter. In other words, it appears that the author was too ready to generalize from one example which may not have been typical. She stated: "While use of the activity will not advance appreciably the day a child begins to walk alone and will not alter the general method of progression, exercise may influence the grade with which he steps, his speed and his mien of progression."

Dennis (17), with a pair of fraternal twins, experimented in the opposite direction. Until eleven months the twins were given no toys; bed-clothes when present were arranged so that they could not be played with, there was nothing to reach for, nothing to see except plain walls, plain furniture, sky, and the tops of trees. There were no pictures or other ornaments in the room. The children came from a family of average socio-economic status. The father was a taxi driver, the mother a salesgirl.

Beginning on the 245th day a dangling ring was presented to each infant for thirty seconds every day for forty days. One infant first reached for it on the thirteenth day and the other on the sixteenth day. The first reachings were clumsy but quickly improved. The infants were placed in a sitting position for the first time at nine months. Neither twin made the slightest effort toward balance, but the retardation was temporary; in thirty-six days one of the infants sat alone for twenty seconds.

When first put on their feet on the 264th day, neither supported his weight. One twin pushed momentarily and slightly on each of the ten trials, the other in four of ten trials. During the remainder of the day and the following three days, many trials were given. Approximately eight hours after their first failure both supported their weight momentarily and by the end of the 367th day both had stood continuously for two minutes. One twin walked at seventeen months, the other at twenty-six months. The experimenters did not wait until the infants made attempts to reach, sit, or stand; but as soon as it was clear that a response was delayed, efforts were made to establish it. During the experiment the infants were in the

best of health with large firm muscles and no rickets. Muscular weakness was in any case ruled out by the fact that the infants never attempted the responses in question and by the fact that grasping and standing were learned quickly, once the opportunities were given.

It is interesting to note that it is these very activities of reaching, grasping, sitting, and standing that McGraw concluded were unaffected by special exercise.

Development of the Prematurely Born

Inman-Kane (40) studied the amount of prematurity and underweight at birth among the mentally defective and among unselected school children. He found (a) that among school children who were either underweight or premature at birth there was more than the usual amount of feeble-mindedness, and (b) that an appreciably larger proportion of the mental defectives than of the general population had been either underweight at birth or prematurely born. He wrote that the evidence appears conclusive that the condition of prematurity or underweight at birth is an etiological factor in mental deficiency. The mental defect is not attributed to premature birth or underweight, *per se*, but to damage, usually intercranial hemorrhages, caused by the birth process. Gesell (31) stated that a study of individual cases of prematurely born children leads to the conclusion that development is not appreciably affected by mere precocity of birth.

The most extensive work on the development of prematurely born children has been done by Hess, Mohr, and Bartelme (38). They examined 250 such children both with the Gesell and the Binet tests and compared the results with those obtained by Gesell and by Kuhlmann from their standardization groups. Also 124 prematurely born were compared with their 152 full-term siblings. When the chronological ages were corrected for the amount of prematurity and those cases eliminated in which intercranial hemorrhages had resulted in brain damage, there were no indications that the mental development of the prematurely born was not equal to that of the control groups. A comparison of the behavior of the 124 prematurely born children with their full-term siblings gave some indications that they were somewhat inferior in their habits and social adjustment. However, as the authors point out, the differences found are difficult to evaluate since the siblings were older than the premature group.

Miscellaneous Studies

Marquis (59) studied the movements in sleep from birth to one year of age both by observation and by means of attaching the crib springs to a recorder. The first half-hour of the nap was found to be the quietest period after which the movements gradually increased until waking.

During the night the second hour was quietest. The periods of sleep without movements were nearly twice as long during the daytime nap as during the night sleep. Between the eighth and twentieth weeks the average number of movements began to decrease and the quiet periods to increase. There was also noted a decrease in the frequency of movements of the larger parts of the body with advance in age and a corresponding increase in the frequency of movements of the small parts.

Richardson (66, 67), using Gesell's set-up, described the development of ability in the child to pull a lure to him by means of an attached string; to select the string attached to the lure from among others that are not attached; and to secure a lure by means of a simple horizontal rotating lever. The ability to obtain the toy by pulling in a string increased from zero at twenty-four weeks to 90 percent at forty weeks. Ability to obtain a toy by means of the lever increased from 20 percent at forty weeks to 83 percent at fifty-two weeks. In the multiple-string situation, where the loose strings were offered along with the attached string, there was no consistent increase with age, a result which is attributed to varying interest in the lure and to the emotional adjustment to the examiner.

Dennis (15) tabulated data from Hrdlicka's book to show that children who first learn to run on all fours do not walk later than those who creep, as Hrdlicka claimed. He found that the average age reported was 12.97 months.

All those studying the mental development of the infant have been able to demonstrate measurable increments of growth in behavior over periods of one month. Thompson (77) tested one infant with the one-inch cubes daily between the ages of forty-six and fifty-two weeks. She found that:

Daily growth in behavior is shown on 60 per cent of the days while at intervals of seven days it was almost invariably evident. Daily growth in weight in the same infant during the same period was indicated on 46 per cent of the days and at intervals of eight days it, too, was almost invariable. That behavior changes are occurring as surely and rapidly as physical growth changes is not an overstatement.

Thompson (78) found that in the course of normal development, some responses to particular situations increase in frequency as development proceeds, others decrease, and still others increase to a certain frequency and then decrease or fluctuate. She is of the opinion (a) that many of the bits of behavior which decrease in frequency with age, or which first increase and then decrease, are as good indicators of development as those which steadily increase in frequency, and (b) that they should be considered when estimating the developmental status of the child.

CHAPTER II

Mental Development from Two to Twelve Years

IN THIS REVIEW the authors have endeavored to bring together the investigations that deal with the mental development of children from two to twelve years of age.¹ The review takes its departure from the summary presented by Cattell (117) in the *Review of Educational Research* in April, 1933, but the scope of the topics under review has been extended somewhat.

Research studies during the past few years have added much to our knowledge of children, but enormous gaps remain to be filled. We can sympathize with the educator who grows impatient with psychology when research findings continue to lag so far behind the practical needs of the day. On the other hand it is sometimes discouraging to find how little available research material has permeated into school practices and how strongly education seems to be fortified against suggestions for critical evaluation or change.

A survey of recent research literature reveals certain constructive trends as well as many continuing weaknesses. An increasing number of studies deal with real aspects of behavior, in a "natural" setting, as distinguished from exhaustive studies of artificial problems by means of superficial technics. However, studies based upon limited cross-sectional snapshots still far outnumber investigations in which an attempt is made to probe the developmental process through continuous study of the same child over an extended period of time. Likewise, many studies continue to deal with isolated aspects of behavior rather than with the relationships between aspects of behavior.

In many areas of study where other more intimate methods are essential for preliminary exploration, the research worker is still a slave to statistics. To upbraid research workers for using statistics is an easy and low form of criticism, but there are times when statistics become the tail that wags the dog. It would be good for educational research if a penetrating and revealing analysis of a few subjects could acquire as much respectability as superficial but "reliable" measurements of large numbers.

In reading a wide variety of studies, one sees many contrasts in the interpretation of data. One writer unhesitatingly jumps from specific findings to universal implications; another is so conservative that he avoids generalizations or applications of any kind. Frequently, the latter is a worker who has been most painstaking in his research, but who shies away from any general ideas when the fatal moment comes for sending his study out into the world. Often it seems that research workers omit illumi-

¹ The authors are grateful to Mary D. Fite for bibliographical assistance.

nating data because they may not meet the requirements of scientific objectivity, refrain from reporting insights that cannot be supported by statistical tables, and avoid general conclusions for fear of future refutation.

The problem of child development as seen by L. K. Frank (147) is "the problem of discovering the rate and direction of change in the structures and functions of the child and of revealing the interrelationships existing among the several structures, functions, processes and activities." From this point of view some of the research material presented in this section may mark the beginnings of what may become an integrated science of childhood.

Growth of Intelligence

The study of mental growth from birth through three years of age which was made by Bayley (3) is a significant contribution to our understanding of intelligence. Mental tests, tests of reflexes, physiological and anthropometric measures composed the examinations given monthly to sixty-one infants. Test items were taken from several infant and preschool tests. Growth was found to be accelerated at first, with a deceleration in rate after ten or eleven months, and an almost constant rate after fifteen months. In general, variability increased with age except between six and twelve months. This coincides with other evidence presented which indicates a change in the functions measured before and after this period. The findings show that the tests are measuring different functions or groups of functions at successive age levels, rather than a unit function of intelligence which extends throughout life. These differences are evidenced in the results of item analysis, in the directional change in the standard deviation score, and in the low correlations over long-time intervals.

Another study from the same Institute presents data concerning the growth and decline of intelligence between the ages of ten and sixty. Jones and Conrad (189) examined 1,191 cases from villages in rural New England on the Army Alpha Scale. The chief characteristics of the developmental curve were linear growth to about sixteen years, negative acceleration beyond sixteen to a peak between eighteen and twenty-one, and a gradual decline to fifty-five involving recession to the fourteen-year level. A study of the data of adolescents reveals interesting material. Information and vocabulary tests exhibit no postadolescent decline, the adult deriving much more of his intellectual power from accumulated stocks of information than the ten-year-old. A differential rate of growth during adolescence for bright and dull children was indicated by the increased standard deviations of scores.

Hsiao (176) presented somewhat similar findings in an investigation of 1,131 subjects in the eastern part of the United States using eight tests from Army Alpha. It was found that between the ages of eleven and fifty-four the early part of the mental growth curve was linear and then became negatively accelerated. Mental maturity varied with the functions tested.

His data do not support Jones and Conrad's finding that variability of intelligence increases at puberty.

F. N. Freeman (148) discussed the question of whether the child who develops rapidly also continues to develop longer than the slow-growing child, and drew conclusions on the subject from long-time records of several hundred children in the elementary and high school of the University of Chicago. A group of 100 children, ranging from somewhat below average to bright, was divided into three groups based on scores on the test during the middle years and the average curve drawn for each group. "The children in the bright group begin to advance at an accelerated rate at about ten years of age. Their curve then advances more steeply for two or three years than do the curves of the other two groups. The curves of these bright children, however, begin to slow down sooner than do those of the others. None of the groups reach their complete development by 17, so that it is impossible to say how far apart they will be when their growth reaches its final level. By 17, however, the upper curve is slowing up, whereas the lower group of children is continuing to advance at an undiminished rate."

Constancy of the I.Q.

The validity of using intelligence tests for purposes of prognosis stands or falls on the constancy of the intelligence rating of children as they develop. A variation of about 5 points plus or minus on two Stanford-Binet ratings is generally regarded as a normal degree of fluctuation and is not considered as evidence of lack of constancy. If larger differences occur the question arises as to whether such variations may be ascribed to inadequacy of the test, faulty technic of the tester, or unusual conditions confronting the child at the time of the testing. The great variability of children when retested during the early years has raised certain questions as to the adequacy of tests used at this level as well as to the possibility of securing cooperation from children below six. One of the difficulties in the studies reported is that the interval between tests often has varied as much as several years and yet data have been thrown together. R. L. Thorndike (318) treated the results of various experimenters by the method of least squares and reported that the correlation between Binet test and retest decreases as interval increases. Studies of the influence of environment on I.Q. do not always adequately differentiate between what may be a change in score on a specific test and what may be a fundamental change in the intellectual ability of the subject.

The studies summarized under this topic deal with superior or gifted children, subnormal children, problem children, and preschool children.

Because Terman's data gave evidence of loss of I.Q. points for children with I.Q. of 140 or above during a six-year period, whereas the Harvard Growth Study showed a tendency for the superior child to increase I.Q. as he advanced in age, Cattell (116) studied the changes which took place

with age in the I.Q. of 288 boys and 268 girls. Table 1 shows changes in I.Q. points on test and retest for this group:

TABLE 1.—CHANGES IN I.Q. POINTS ON TEST AND RETEST, AFTER CATTELL (116)

I.Q. Level	Boys		Girls	
	Number	Median	Number	Median
Below 80	24	— 2.5	17	—2.5
80 to 89	59	— 4.7	53	—4.3
90 to 99	99	+ 0.9	84	—2.0
100 to 109	69	+ 4.3	70	+2.0
110 to 119	28	+ 6.2	33	+2.7
120 and above	9	+12.0	11	+7.0

The conflict between these results and the Stanford findings may be due to the method of selecting the cases and the difference in the ages of the two groups. A similarity in the two studies is shown regarding sex differences in that the Stanford study showed a greater decrease in the I.Q.'s of the girls than of the boys, while this study shows a smaller gain among the girls than among the boys.

Lincoln (209), testing ninety-two younger children (before entrance to kindergarten or first grade) who scored 119 I.Q. or above on the Stanford-Binet, and reexamining them at intervals ranging from five to eight years, found a range of I.Q. changes from a 36-point loss to a 35-point gain. Slightly more than one-third of the group changed less than 5 points. Comparisons were made of performance on different test items.

One hundred sixteen children who had tested 130 I.Q. or above on Stanford-Binet at the first test were retested ten years later by means of the Army Alpha test by Hollingworth and Kaunitz (173). The median age of children at retest was 18.5 years. Since 82 percent of the children who were in the top centile remained there ten years later and since no individual regressed to or nearly to normal, the authors concluded that the results validate the predictive power of available mental tests and the constancy of intellectual development of gifted children.

Nemzek (250) made computations from data already published by others and concluded that correlations between repeated I.Q. ratings of superior children tend to be lower than for unselected groups and that the direction is toward increased scores on later tests. The author attributes this latter to practice effect. Lämmermann (198) gave batteries of intelligence tests to fifty-three children between nine and ten years of age for six successive weeks. The rank order obtained from the individual tests did not change much and there was no leveling effect due to practice. But the experimental group improved considerably more than a control group, which fact the author attributed to practice effect.

The study of subnormal children by H. T. Parker (259) supports other findings regarding the constancy of the I.Q. in retarded children. The data for the study consisted of 1,462 tests of 552 subnormal children nine to fifteen years of age from the Education Department of Tasmania. The average interval between tests was approximately one to one and one-half years. In three-fourths of the cases a decline in I.Q. was reported after a period of about four years, with an average annual decline of about 1.5 points in I.Q. over the total period from nine to fifteen years of age. The author stated that the decline is practically independent of particular classroom methods.

Two studies were contributed from the Institute of Juvenile Research dealing with problem children. Brown (106) reported on 124 children examined two or more times over periods varying from two to twelve years. The children had a mean chronological age of 8.19 at the first test and 15.86 at the last test; a mean I.Q. of 81.94 at the first test and 78.02 at the last test. There is a correlation of $.79 \pm .02$ between I.Q.'s on first and last test in which the average time interval between test and retest is 7.67 years. In general agreement with Thorndike, correlations between tests and retests were higher for those examined within a two-year interval than those examined after three years. There was a tendency for these individuals to lose in their rating rather than gain after an interval of five to twelve years. The data as presented do not permit exact comparisons with Cattell but indicate that there is not the tendency for lower I.Q.'s to decrease score with age and for higher I.Q.'s to increase score with age.

Gildea and Macoubrey (157) attempted to analyze factors which may have affected the change in I.Q. of 431 children, ages six to sixteen with I.Q.'s ranging from 30 to 120. This was done by matching children who had fluctuated 10 or more points with children whose scores fluctuated less than 6 points. The length of time elapsing between two tests was greater for the children with greatest fluctuation in I.Q. Children who gained in I.Q. more frequently showed improved physical condition and symptomatic behavior and had parents whose attitude became improved.

Driscoll (24) investigated the usefulness of two preschool tests (Merrill-Palmer and Kuhlmann-Binet) for prognosing the future mental ability of children. A total of 254 children, ranging in age from twelve months to forty-eight months at the time of the initial test, was included. Comparisons were made with initial test scores and retests given at intervals of six months, twelve months, eighteen months, and twenty-four months; also between tests given before four years and tests given after five years with the Stanford-Binet. In general the data show that the retests gave positive but not sufficiently high correlations to make confident prediction of a child's exact future status possible on the basis of tests given before four years of age. Line and Kaplan (210) presented data from fifty-four case histories, each having at least five Binet tests, the first of which was given before the age of three. Among other findings the authors

13.8.70
I.Q. 174

stated that the increase in I.Q. is greater for those who originally appear to be less bright. This is in agreement with Wellman's study of preschool children (328) but is not in line with Cattell's study of older children just cited. Kavin (192) reported similarly a great amount of variability on retests of preschool children. Since the tests were given at intervals varying from one to forty months, results are difficult to analyze. No consistent relationship was found with chronological age, level of intelligence, interval between test, or sex. Correlations of .552 were reported by Cunningham (14) between Kuhlmann-Binet tests given to twenty-seven children at twelve months of age and Stanford-Binet tests given seven years later.

That a change in environment may bring about an improvement in the I.Q. of children was proposed by Lithauer and Klineberg (212) on the basis of a study of 120 children who were tested upon entrance to an orphan asylum and again after a period varying from a few months to several years.

Other studies on this topic include W. S. Miller (244) and Nemzek (249) who summarized researches on the constancy of the I.Q.

Factors Related to Intelligence

A large number of studies has been published, the general purpose of which has been to understand factors which may have influenced growth in intelligence or factors which may correlate with ratings of intelligence. F. S. Freeman (150) summarized and interpreted research up to the present time on the nature and causes of variation in intelligence and special abilities.

Among these studies are several which attempt, from different approaches, to discover the relation of heredity and environment in determining the level of intelligence. The accumulating evidence emphasizes the interrelation of factors and the importance not only of heredity but of parent relations, sibling relations, social interaction, school guidance, nutrition, illness, motor skills, and the like on the development of any individual child.

One approach to understanding the factors related to intelligence has been to study the relation of intelligence of children and the socio-economic status of parents. Lawrence (200), studying over 1,700 children eleven and twelve years of age in homes and institutions in England, found a correlation of $.25 \pm .07$ to $.29 \pm .06$ between I.Q. of children and fathers' class, this being greater for children who remained longer in their homes. Hildreth (170), Jordan (190), Engle (137), and Kiri-hara (194) studied the relation of intelligence of children to occupations and socio-economic status of parents, and found in general that scores increased with the economic level.

Another approach to the same problem has been through studying the correlation of the intelligence of children and parents. A large group of

studies has in general found a correlation of about .50 between the intelligence of children and their parents; but just what this correlation means, no one has ever made quite clear beyond the fact that a chance resemblance would give a correlation of zero. Such studies, however, do not tell us whether the correlation is due to the influence of home environment or to the influence of inheritance. Penrose (266), in a British study of 100 families, claimed that likenesses between the intelligence of children and parents can be accounted for by the assumption of alternative, additive Mendelian factors.

Two methods have been used in an attempt to evaluate these factors. One method has been to study children in adopted homes. Studies by Leahy (201, 202) of the influence of the home environment on intelligence offer the most comprehensive and careful inquiries into this question since the investigations by Burks (110) and F. N. Freeman and others (149). In a preliminary study Leahy (202) analyzed the social case histories of the unmarried mothers of 2,287 children who were placed in adoptive homes and 4,213 children who were retained by their own mothers. In general, children who were adopted had true mothers who were higher in educational attainment and true parents who attained higher occupational status, this tendency being greater for true parents of children placed at three months or younger. There was a positive relation between cultural level of adoptive homes and of true homes indicating a resemblance between adoptive parent and child entirely apart from any influence of environment and training. In a later study (201), a comparison was made of the children in foster homes and children living with their own parents. Leahy concluded that variation in I.Q. is accounted for by variation in the home environment to the extent of not more than 4 percent; that the hereditary component in intelligence causes greater variation than does the environment; but that variation in personality traits measured in this study appears to be accounted for less by variation in heredity than by variation in environment.

Another method of attempting to solve the nature-nurture controversy is through the study of twins reared in different environments. Schweisinger (295), after presenting an analysis of present information regarding the influence of heredity and environment, stated that the only direct attempts which can be made to study their effect on intelligence of the individual are those which compare the development of identical twins reared in different environments. The assumption is, of course, that identical twins being identical at birth, any differences that occur are due to environmental influences. Newman (251, 252) has added two more case studies of identical twins reared apart to the four reported by Cattell (117). One pair of twins reported were thirteen and one-half years old. One (Richard) was adopted at the age of one month into a truck farmer's family. He had lived in several different places and in every way had supposedly inferior advantages to the other twin (Raymond). Raymond was adopted at fourteen months by the family of a well-to-do

city physician. The twins at the time of the report were physically almost indistinguishable. They were in the same grade in school and both had the reputation of being very alert and interested in studies. They had always had many interests in common. The results of five intelligence tests showed them to be approximately equal, what little difference there was being slightly in favor of Richard. Temperament-emotional tests showed rather decided differences, but the writer believed that the boys were yet too young for these differences to be taken seriously. Richard, however, seemed to be distinctly more aggressive and more positive in his reactions, probably because of the more varied and harder life that he had had.

Case VIII is an account of a pair of identical twins studied at sixteen years who had at three months been adopted into different families. Twin M had in every way had superior cultural and social advantages, while Twin R's home life had been anything but broadening or stimulating. Educational advantages, however, in terms of schools attended had been approximately equal. Scores on intelligence tests showed in every case large differences in favor of M. Performance on temperament-emotional tests showed that M's emotional life was more like that of the average person than R's, though both were highly emotional. "These findings tend to emphasize the educational value of the informal cultural environment of the home superimposed upon the formal discipline of the school."

Previous studies have pointed out that the assumptions underlying the twin studies are open to question. Mason (231) studied three pairs of monozygotic twins and one pair of dizygotic twins who were examined in kindergarten and seven years later in junior high school. She concluded:

In general, in neither physical, mental, or personality traits were these twins "identical." The monozygotic pair III differed markedly in physical appearance and in intelligence. The dizygotic pair IV was much alike in physical and intellectual measurements. Only Twins II were strikingly alike in personality. It would seem best, then—as others have pointed out—to discard the term that implies duplicate or identical characteristics.

Sontag and Nelson (308, 309), in their report on triplets, contributed to this point of view. Other studies of twins include P. A. Parker (262), Orgler (257), Carter (115), and White (329).

Hurst (180) attempted to work out a genetic formula for the inheritance of intelligence. This formula, which is "hexagenic involving one major and five minor pairs of genes" is said to be sufficiently accurate in a qualitative sense to be used as a working hypothesis for families.

In order to determine the nature and extent of environmental influences upon mental test performance, Jones, Conrad, and Blanchard (188) studied the performance on Stanford-Binet tests of over 1,400 children from rural and urban homes. In summary it is inferred that a rural child moving to the city would increase his intelligence test scores merely as a result of changed environmental conditions. His handicap is specific, not general; depending on the test items, it is sometimes transitory but

more often cumulative. Nature-nurture inquiries of a fundamental character can in the future be conducted more profitably on the basis of specific tests, rather than on the general composites represented in I.Q. or mental age.

Gandy's interesting comparison of the concepts of urban and rural children (153) throws some additional light on environmental influences. In such areas as nature, recreation, occupations, institutions, and transportation she found thirty-two concepts that seemed to be significantly urban and thirty-three that seemed to be significantly rural. Furfey (152), also interested in rural and urban boys, found a precocity of urban boys over rural fairly evenly divided over the six tests presented.

Schwesinger (295) stated, "In regard to the influence of physical factors, health, disease, injury, etc., on intelligence, the evidence is strikingly and consistently negative, except in those cases of extreme injury, toxic condition, bacterial invasion or other damage to the control nervous system." This is substantiated by Nilson (255) who studied physically disabled children; by Richey (274) who found only a small and statistically unreliable difference between children with diseased tonsils and children with removed or "normal" tonsils and adenoids; by Schell (290) in studying the effect of intestinal protozoa on intelligence and personality traits. On the other hand, Liefmann (208) in Germany found that among ten-year-old girls the healthier child is generally the abler one, in line with other similar studies. In contrast, Maller's statistical study of 100,000 fifth-grade pupils in New York City (223) presented negative correlation of I.Q. with such health measures as visual defects, teeth defects, condition of tonsils, nutritional status. However, by holding economic status constant, a correlation of $.28 \pm .04$ was found between health and intelligence. He also found negative correlations with such neighborhood social data as death rate, infant mortality, juvenile delinquency, and birth rate but a positive correlation of neighborhood rentals (economic status) and intelligence of children.

Studies which specifically aimed toward analyzing sex differences re-emphasize the negligible differences which are found between the sexes in general intelligence but indicate differences on specific items within the tests. Armstrong (89) found differences in specific items of the performance scales for boys and girls in grades four to eight, some in favor of boys and some in favor of girls. Heilman (168) reported that the difference in average scores of ten-year-old children in spelling and language was in favor of girls, and in favor of the boys in arithmetic and nature study. Conrad, Jones, and Hsiao (120), in an extensive study in rural Vermont, found similarly that some test items had no sex differences, some only slight, and some in favor of one or the other sex. The impressive fact is the similarity of developmental curves for the two sexes. The authors concluded that the direction and extent of sex differences in a composite mental test are dependent upon the composition of the test and the weighting of its parts. Rosanoff and associates (280) studied the sex distribution

of I.Q. in eighty-three pairs of mentally deficient opposite sex twins, 233 pairs of normal or superior opposite sex twins, thirty-four pairs of superior monozygotic twins, and 2,017 siblings—a total of 1,010 boys (average I.Q. 105.6) and 1,007 girls (average I.Q. 107.9). They concluded that there was about one-fifth or one-fourth difference in favor of girls which seems to be due to sex-linked genetic factor or factors. This they believe is due to the greater vulnerability of male fetuses which brings a higher incidence of both relative and absolute mental deficiency in the male than in the female sex. Such pathogenic factors which affect the fetal period are more often at work in multiple than in single births.

Factors influencing scholastic ability have been studied by Engle (137), Farson (141), Monnin (247), H. T. Parker (261), Rogers (279), Levy (205), and Russell (285). Home environment, including maternal over-protection, economic status of family, physical and mental status of the student, and personality traits including perseverance, were among the factors found to be influencing school achievement.

Wellman's investigation (328) of the effect of attendance at nursery school upon the intelligence quotients of 600 children has significant implications. Children were studied at six-month intervals while attending the nursery schools and at approximately one-year intervals up to the age of fourteen years and six months, when they were attending elementary and high school. Significant gains in I.Q. were made while the children attended nursery school, the greatest gain being made by children in the lower levels of I.Q.

Saller (286, 287, 288, 290) in Germany made a series of studies of the relation between intelligence, social stratum, and differential rate of reproduction. His conclusions pointed out the relation of higher intelligence to smaller reproductive rate and of lower intelligence to greater mortality, the effect of environmental factors on intelligence of rural children, and the effect of both hereditary and environmental factors on children's school work.

A negative trend of correlations between basal metabolism and mental speed was reported by Steinberg (312). Intelligence appears to have no particular relation to age interval of siblings according to the study of Finch (144) of 1,023 pairs in 614 families. Pintner and Forlano (271) found no consistent relation between month of birth and intelligence.

Other studies in this general area include those by Vértés (326), Murphy (248), Barke (92), Hildreth (169), Holman (174), Jenkins (184), MacKane (219), and Van Wagenen (325). W. R. Miles (242) has summarized previous studies on the relation of age and human ability.

Mental Retardation

The relation of mental deficiency to heredity has been the concern of psychologists for many years. Woodall (334) studied 119 children over six years of age whose mothers had been patients of the Fernald State

School, an institution for the mentally defective and mentally retarded. Mental levels of the children ranged from imbecility to superiority, with 16 percent of average or superior mentality and 44 percent mentally defective. The study is in agreement with generally accepted principles in that although the average mental level and general physique of the children were superior to their mothers, a high positive correlation was found between the I.Q.'s of mothers and children.

McNeil (221) is convinced that heredity plays a very small part in the production of mental deficiency and that its influence has been greatly exaggerated. His conclusions are based on clinical observations of 1,000 cases of mental deficiency where he found in 85 percent of the cases that the condition was congenital and in 65 percent antenatal in origin.

Since there is considerable evidence that a larger proportion of gifted children come from the higher socio-economic classes, it might logically be assumed that the lower socio-economic classes contribute more than their share of mentally retarded children. Paterson and Rundquist (263) attempted to test this assumption by studying the parental occupations of 823 inmates of the Minnesota School for Feeble-Minded. It was found that 87.4 percent of the fathers came from the three lower occupational levels as compared with 59 percent of the random sample and 12.6 percent from the upper three levels. The authors called attention to the fact that the fathers of "idiots" tend to be representative of the general occupational distribution found in society and state: "These results suggest that pathological and accidental cases of feeble-mindedness occur on all levels of society, whereas cases of simple feeble-mindedness due to biological heredity arise from parents whose low mentality confines them to the semiskilled and unskilled levels of work."

In an effort to determine whether the size of the family in which the mentally deficient is born and subsequently lives has any effect upon his characteristics, Dayton (129) studied 20,473 retarded children in the public schools of Massachusetts. Evidently the statistics were taken from school records, though the author does not state this. The average size of the family of the mentally deficient was not different from that of the general population if correction is made because of the preponderance of foreign element. The author analyzed certain characteristics of children which seemed to be associated with larger and smaller families. Undoubtedly more insight would be obtained if a study were based, not upon analyzing one factor in isolation from the many factors affecting child life, but rather upon the interrelation of various factors on development.

Fairbank (138) reported a study of 122 children, seventeen years after they had been diagnosed as subnormal, and compared them with 100 normal children from the same community. So-called normal sex life (marriage) as well as abnormal sex-life (promiscuity, prostitution, and illegitimate births) were more frequent (though only slightly so) among the subnormals than the normals. The police records were about the same for

both groups, though there was a larger percent of juvenile court records for the subnormal. Economically there were differences but not great ones: the subnormals almost equal the normals in self-support (two-thirds earning their living as laborers) though 10 percent were receiving financial aid; their living conditions were not so comfortable as those among the normals. There was a discrepancy in education between the two groups since several of the normals graduated from high school and a few went to college, but most of the subnormals went no further than the fifth grade.

Lithauer (211) reported a follow-up study of twenty-five slow children who were retained in the kindergarten until they had attained a mental age of six years. During the five years, sixteen had made normal progress. Suggestions are given for adapting school work to the needs of these children.

The effect of physical and mental training on mentally deficient, birth lesion children was studied experimentally by Martz and Irvine (229). Special physical training, academic and occupational instruction were given for periods from four to twelve months, to eighteen patients at Letchworth Village. There were gains in I.Q. in all but one case, idiots gaining most on the average and morons least. The effectiveness of the physical training seemed to be a direct function of its duration.

Supervised play as a means for specific as well as general education for mentally retarded children was upheld by Schlotter and Svendsen (293) on the basis of two years' work at the Lincoln State School in Illinois. Daily periods of supervised play brought such results as general improvement in individual behavior, attitudes, and group discipline; actual learning of complex games; improvement in table manners and in dressing; improvement in attitude of employees toward wards. Many practical contributions in the field of play with subnormals are offered.

Other studies include a survey of 500 retarded children in Massachusetts by Lord (213); an analysis of the responses of forty-three abnormal boys ten to fourteen years of age to the Rorschach Test by Ganz and Loosli-Usteri (154); and a discussion by Peters (267) of the "indeterminate" type of abnormal child on the basis of data secured from the application of the Bourdon test of concentration to 129 retarded children.

Language

Researches in the development of language have made material progress in defining sequences in the growth of vocabulary, sentence structure, and ideational content. Several studies give girls an edge over boys in early language development.

Fisher (145) studied the development of language in preschool children through an analysis of stenographic records of the language of seventy-two children, aged two to five years. Each child's language was recorded during a total period of nine hours in the nursery school. The findings showed the rate of decline with age in the amount of non-verbal

or incomprehensible speech, in the proportion of exact repetition and incomplete sentences, and in the increase with age in length of sentences and in proportion of complex sentences. Girls were, on the whole, superior to boys. A high degree of egocentricity was revealed at all age levels, with a decreasing amount of talking about things and an increasing amount of talking about people.

Stalnaker (310) traced the development of language as shown by records of the conversations of fourteen children, aged two to four years. The findings include an analysis of the words, parts of speech, sentence structures, and grammatical forms most frequently used. According to the findings, the younger the child the more egocentric the speech will be.

M. E. Smith (303) analyzed grammatical errors in the speech of 220 children aged one and one-half to six years, as revealed by records of the children's spontaneous conversations. The most common error was the omission of an essential word; next in frequency were errors in the use of a verb; the use of articles was found to be learned relatively late; case was the most troublesome feature in the use of pronouns. As early as the age of three, many errors were due to generalization: rules for regular forms were extended to words of irregular inflection. Girls were superior to boys at two years but not consistently thereafter.

In a study of the development of the sentence, M. E. Smith (305) analyzed the spontaneous speech of children, aged one and one-half to six years. Parts of speech and aspects of sentence structure were analyzed in detail. There was a high correlation between sentence length and vocabulary. Girls excelled boys at two years. Smith also dealt with the relationship between language development and the child's social status and his order of birth. The relationship between vocabulary and the child's social status was also touched upon in a brief study by Cuff (124). Nice (254) studied the development of sentence structure through an analysis of complete records of the language of a child who was observed from the age of fourteen months through thirty-one months and then again at the age of three. The results give an interesting picture of the changes that took place from month to month. La Brant (196) studied aspects of language development through an analysis of compositions written by about a thousand children in the fourth through the twelfth grades. Children were compared with psychologists who contributed to "Psychologies of 1930."¹ All clauses were classified according to main and dependent clauses, and changes with age were noted.

Children's questions, their frequency, form, and function were studied by M. E. Smith (304) in a further analysis of records of the language of 219 preschool children. The proportion of questions to total number of sentences was found to increase up to the age of four years and then showed a decline. "What" and "where" were used most frequently by the youngest children; "how," "when," and "why" were not used at all

¹ Murchison, Carl, editor. *Psychologies of 1930*. Worcester, Mass.: Clark University Press, 1930. 497 p.

at two years but showed a yearly increase thereafter. Questions as to the whereabouts or the names of persons and things declined with age, while questions concerning fact, time, invention, intention, and causality increased. Boys asked more causal questions than girls, while girls exceeded boys in questions concerning social rules and questions concerning places and names.

The amount and nature of a child's vocalizations in relation to the situation in which he is acting (alone in nursery, in the bath, in the company of other children, etc.) were studied by Ellesor (136).

The development of language in twins was studied by Day (128), whose subjects included twenty pairs of twins at each age level from two to five years. Again in this study boys were found to be somewhat inferior to girls at most age levels and upper occupational groups were superior to the lower occupational groups. Most of the twin groups were below average in I.Q. On the average, the twins began to talk one month later than their older siblings. Identical twins showed higher resemblance in language development than did fraternal twins.

The effect of a bilingual environment was studied in a further investigation by M. E. Smith (306). The subjects were eight children who made frequent moves between America and China. A bilingual environment did not seem to delay the first use of words but operated as a handicap at a later age; change from a monolingual environment to a bilingual one apparently is likely to affect a child's speech more than a change in the opposite direction. The author also concluded that it probably is better for young bilingual children to receive their two languages from quite separate sources rather than to be spoken to in two languages by the same person. Children, aged ten to fourteen years, enrolled in three bilingual schools in South Wales in districts in which children learned Welsh at home before beginning a systematic study of English in school, were compared with children in exclusively English speaking districts in a study by Barke (92). The children in the monoglot schools were superior to the bilingual children in verbal intelligence tests, but on a non-verbal test (Pintner Non-Language Test) the bilingual schools had a slight advantage.

The problem as to whether common emotional expressive reactions are native or acquired is one that has significance from the point of view of language when considered in the broad sense of social communication. Goodenough followed her earlier investigation in this field with a study of a blind-deaf child (159). This child, who had been practically devoid of opportunity to observe the expressions of others, showed in her own expression a strong resemblance to the well-known descriptions of Darwin and Spencer. This observation suggests that the primary forms of expressive behavior are determined by native factors.

Learning

The question of the influence of practice has been investigated not only with infants but with preschool and elementary-school children and adults. Jersild and associates (187) contributed to the discussion of maturation versus training of children by eight experiments, using the equivalent group method. There were 121 practice and 127 control subjects, ranging in age from two to ten years. In all experiments the practiced children showed some advantage over the controls at the end of training but on later tests (several months later) the practiced children maintained this lead only in the case of ability to sing tones and intervals. This is in keeping with the claim that training can help a child to add new items to his repertoire, to extend his knowledge or skill. The gains produced by practice in all experiments were relative to the child's initial capacity, and individual differences between children were not substantially altered by training. Mirenva (246), in studying the influence of psychomotor training on the general development of twins, concluded that the development of more elementary functions such as jumping depends less on training than do the more complex intellectualized psychomotor functions such as hitting a mark by throwing a ball. This is in line with Jersild's findings.

Another study which shows the impotency of training of certain functions was made by Hilgard (171) who studied the effect of early and delayed practice on memory and motor performances in an experiment with a pair of twins. The twins were fifty-four months old at the beginning and sixty-six months old at the end of the experiment. Following initial tests, one twin received practice while the other served as a control; both were then retested; thereafter the second twin was practiced (delayed practice) while the previously practiced twin served as a control. Each practice period was eight weeks in length, and retests were made three months and again six months after the termination of delayed practice. Delayed practice resulted in superiority for the delayed-practice twin in object-memory, digit-memory, ring-toss, and on two of several boards used in a walking board test. At three and again at six months after all practice had ceased, the performances of the children on all tests were as similar to each other as at the beginning of the experiment.

Cox (122) studied the relative effects on learning of adults and boys of elementary-school age who were given no practice, undirected practice, and directed practice or training. Thirty-nine adults (with thirty-one controls) and thirty-nine boys (with thirty-two controls) were included in the experiment. The operations investigated were those involved in assembling and wiring an electric lamp holder and in stripping the same. In the first experiment the practice group was given practice on one of the four operations involved (eleven days' practice for adults and five for children). For both adults and boys this practice resulted in superiority over control group in operations practiced but not in other operations. In the second experiment, where training in one operation was substituted

for mere repetitive practice, the practiced group showed marked superiority in all operations. No correlations were found between intelligence and progress during training.

A rolling-ball maze of three levels of complexity was used by Mattson (232) to study the effect of complexity of a task on the learning of fifty children from five to six years of age. Control groups were formed by matching two individuals for sex, chronological age and I.Q., and initial maze ability. The practiced subjects were superior to the unpracticed subjects on the test following practice and less markedly on the retest after sixty days. The superiority was slight upon the simple pattern, marked upon the pattern of intermediate complexity, and still more marked upon the most complex pattern. Individual differences tend to increase as a result of practice on the more complex task whereas they tend to decrease on the more simple task. This is in line with previous studies.

An initial study of the ability of preschool children to generalize methods of solution in a series of similar but different situations was made by K. E. Roberts (276). An ingenious apparatus was devised which made possible nine situations each of which could be solved according to the same general plan. Forty preschool children, between the ages of three years, six months and seven years, ten months with I.Q.'s from 80 to 150, were used as experimental subjects. The data show that these preschool children did apply the learning of the initial situation to later situations. The learning of the initial solution was more closely related to mental age than chronological age but this did not hold for the application of the solution. The author further analyzed data regarding children's verbal responses and concluded that failure to respond verbally should not be taken as inability to respond nor as indicative of inferior ability in learning of the type represented by the experiment.

Investigations concerned with the effect of certain personality manifestations on learning were reported. A study was made by Poyntz (272) who investigated the susceptibility of preschool children (ages twenty-six to sixty-six months) to visual and auditory distractions while performing a relatively simple peg board task. The distractions consisted of sounds from the metronome, music on a toy victrola, electric light which flashed intermittently, a group of toys, and two pictures. The I.Q. range of the children was from 90 to 131 with a median of 106. Some of the distractions (especially the metronome, victrola, and electric light) acted as incentives to the children to hurry and finish. The author concluded that visual distractions have a much more disturbing effect on the performance of a task involving visual attention than auditory distractions. This susceptibility to distraction is a trait independent of sex, chronological age, I.Q., or socio-economic status and varies not only from child to child but from time to time in the same child.

The persistence of eighty-three normal and defective children in six tasks was studied by Crutcher (123). The children ranged in age from

seven to sixteen years. Scores of persistence correlated .30 with I.Q.; highest scores were made by children who talked least; the children indicated that they liked best the tests in which highest persistence scores were made.

A study which may have far-reaching effects on the guidance of children in social adjustments was reported by Jack (182). The study dealt with the effect of the learning of certain skills on the child's social adjustments. Five non-ascendant children received training in making block designs, solving a picture puzzle, and telling a story that was illustrated by pictures. The children were then paired with other subjects who initially surpassed them in ascendant behavior. The subjects who had received training showed a decided increase in their ascendance scores.

Carter, Jones, and Shock (114) made an experimental study of the relationship of efficiency in learning lists of words and various measures of affective conditions such as association times, word responses, galvanometer deflections, respiration, and blood pressure. The children studied were fifty-one boys and fifty-one girls in the sixth and seventh grades. The authors concluded that the results indicate a definite relationship between emotional factors and ease of learning. Learning scores of individuals tend to be highest for pleasant words, next for unpleasant, and lowest for indifferent.

The general superiority of the whole method of learning poetry which has been accepted for many years was challenged by McGeoch (217) in a study of 310 children between nine and eleven years of age. In the experiments reported, no reliable differences were found between the whole method and the part method in either learning or retention.

In the field of motor learning, Melcher (235) showed that visual methods in guidance were more effective than manual methods for children three to five years learning a maze. Data from Beebe's study (97) indicate a slight positive relationship between learning on a balance board and nutritional status. Langhorne (199) studied age and sex differences in the acquisition of skill in the operation of a pursuit-meter. The subjects were seventy-eight children, aged seven to seventeen years. In general, it was found that both the limit of improvement and the rate of improvement from practice increased directly with age, with the period of greatest improvement appearing during, or near the beginning of, the adolescent period. The order of the individuation of the movements through practice proceeded from the trunk, shoulder, and arm toward the finger. Beebe (98) also analyzed the eye and hand coordination of eight four- and five-year-old children in aiming and thrusting at a target under conditions of normal vision and under conditions of prismatic deflection.

In investigating motivation in learning, research studies continue to show disagreement regarding the relative effects of reward and punishment, success and failure. The literature indicates the inadequacy of generalizations based upon specific and limited approaches to this problem and shows the importance of taking account not only of the specific

nature of the incentive that is used but also of the type of task and the type of child involved in the situation.

Tuckman (321) used the word "wrong," and saying "wrong" plus depriving the child of a fraction of a cent or administering an electric shock, as contrasted with the word "right." The subjects were 100 boys aged eleven to fifteen years; the task was word and nonsense word association. The influence of a mild, spoken "wrong" differed little from an emphatic and substantial pain or deprivation. In every experiment and in every degree, punishment did more harm than good.

In an interesting study by Chase (118), dynamometer tests were given to over 200 children aged two to eight years. Praise or reward (e. g., a gold star) was more effective than knowledge of success; reproof or punishment (e. g., having a button cut off a paper gingerbread boy that had been given to the child) was more effective than mere knowledge of failure. Failure-reproof and failure-punishment were about equal in effectiveness. Failure-repetition was superior to success-repetition. Reproof for failure was more effective than praise for success. According to the findings, the chances are that failure-punishment is more effective than success-reward.

Anderson and R. S. Smith (88) restudied 102 of Chase's subjects after an interval of three years with a slight modification of Chase's methods. Again the subjects performed better when reproved for failure than when praised for success. Failure-punishment was now definitely superior to success-reward. As in the earlier study, success-reward tended to be more effective than success-praise; failure-reproof and failure-punishment continued to be about equally effective. In both studies some motivation was more effective than controlled motivation (no knowledge of results and mere repetition of instructions).

E. L. Thorndike and Forlano (317) found that the learning of a series of lines of English and Spanish words by boys ten and eleven years of age was facilitated by small amounts of money (up to 0.4 cent) but was decreased by an increase to 0.8 cent because of excitement or other factors.

The influence of previous success or failure on a child's interest in returning to a task has been studied by Rosenzweig (282) by means of jigsaw puzzles, one of which the child was allowed to complete and the other of which was removed before completion. Later the child was asked which he preferred to do again. The subjects were thirty-seven children aged five to fourteen years. Thirty-two of thirty-seven children chose the puzzle on which they had succeeded. This tendency was strongest in the youngest children. The results in this study stand in interesting contrast to findings enthusiastically reported by Koffka (195:357) in a review of a study by Ovsiankina. In this investigation, children's reactions to completed tasks as against uncompleted tasks were compared: "For days afterwards children would ask to be allowed to finish the incomplete tasks, while they never asked for the repetition of a completed task."

Marinesco and Kreindler (226) reported experiments on conditioning of the withdrawal response to electrical stimulation in twenty-five children ranging in age from twenty-five days to three and one-half years. The response of the child tended to be general at first; later a specific hand or leg withdrawal occurred. In general the results verify those of Pavlov and his collaborators but certain additional data are reported. The authors urge a revision of educational principles in the light of conditioning.

Whether the ease with which inhibition may be conditioned is constitutional or not was the problem which Cowan and Foulke (121) set out to investigate. There were three experimental series in which the subject was asked to respond to a series of colored lights or a buzz but not to respond to one colored light. This light was always preceded by the same stimulus, this being the "conditioned" color. The subjects included adults, children, and college students, the exact ages, sex, and I.Q. not being given. The results indicate that an inhibition could be conditioned which varied (in delay of response) for different subjects, but the variations were not wide for the same subject at different times. The authors classified the subjects into groups which were termed hyperinhibitive (delayed type), hypoinhibitive (accelerated type), and balanced. A fourth type, the individual who is intermittently subject to domination by the two extreme factors, is suggested. By statistical analysis the authors concluded that the character of variations is not influenced by age or training.

Many technical studies in the field of conditioning and unconditioning of children continue to come from the Russian laboratories but are not included in this review because their immediate significance for education is not apparent.

Among other studies in learning are Davidson (126), Calhoon (111, 112), Bigelow (102), Whiteside (330), Stroud and Maul (314), Düker (133), and Fajans (140).

Memory

Studies of memory may be divided into two groups: studies in the development of memory, and studies of reminiscence and early memories.

Bryan (108) attempted to furnish more definite data concerning the organization of memory as a mental trait by studying 200 children between five and six years of age with an I.Q. range from 60 to 139. The children were given a battery of eleven memory tests and two so-called non-memory tests (a vocabulary test and the Stanford-Binet Intelligence test). The author reported evidence of a central factor through the memory tests and also extending through both the vocabulary and the intelligence test. An analysis of the Stanford-Binet test showed that it is predominantly a memory test on its early levels. The conclusion was drawn that the central factor is probably a memory factor and that it probably indicates a relation between simple retentivity and the more general ability which is termed intelligence in young children.

Another study of preschool children (two-, three-, and four-year-olds) was reported by Mallay (222) who investigated memory span by the use of three types of boxes varying in difficulty for their successful opening. Latent memory spans increased with age, generally following the negatively accelerated curve, but showed variations which might be related to other factors than maturation alone. The methods used by the experimenter greatly affected the length of memory span, two-year-olds evidently being dependent on verbal directions in addition to visual directions. The length of memory span ranged from 0.3 days to 19.8 days depending upon the type of box, the procedure used by the experimenter, and the age group of the children. Certain personality traits of individual children also affected the results.

The development of memory in older children was studied by Hsiao (175) and by Brunswik, Goldscheider, and Pilek (107). Hsiao tested the immediate memory of 639 subjects from eight to nineteen years of age by the use of eighty pairs of stimulus and response words. Exposure was limited to one second for each pair; recall followed immediately upon the presentation of each ten pairs. For memory of physical relationships and for logical-abstract material, the growth curve had a tendency toward positive acceleration before the age of thirteen; but for logical-concrete and concrete-associated-with-abstract materials, the curve was linear between nine and twelve years of age. There was only slight or no growth after the age of fourteen years. Boys were superior to girls.

Substantiation for Karl Bühler's theory of three stages of development (instinct, training, intellect) and Charlotte Bühler's doctrine of phases was found in the study of 800 subjects between six and eighteen years of age by Brunswik, Goldscheider, and Pilek (107).

Holaday and Stoddard (172) studied the ideas remembered by children after having seen a motion picture. Using adult recall as the standard, it was found that very young children remember correctly 50 to 60 percent of what they see; eight- to nine-year-olds remember 60 percent; eleven- to twelve-year-olds, 75 percent; and fifteen- to sixteen-year-olds, 91 percent. It was found, in general, that second- and third-grade children, after six weeks, retained 90 percent of what they could recall the day after they had seen a motion picture.

Other studies in the development of memory include Fedorov's study of children with speech defects (142); Baumgarten's case study of a gifted young orchestra leader (94); Vértes' experiment with deaf-mute children (326); and the investigations of Schiel (291) and Shimidu (300).

In an effort to discover whether age really is a factor in reminiscence, McGeoch (215) tried a learning experiment with 100 preschool children and 100 college students and concluded from the data that reminiscence is not a function of age. In another study McGeoch (216) found no evidence that degree of learning is an influencing factor. One might question whether the author has not simplified the experiment to such an ex-

tent that college students would not have equal motivation with preschool children for remembering.

Dudycha and Dudycha (131, 132), through the reports of 129 college students, studied certain factors related to childhood memories. The majority of childhood memories dated back to the third and fourth years of life, the mean age being three years, seven months. Fear, joy, and anger appear the most frequently in childhood memories but wonder and curiosity, sorrow and disappointment, pain, shame, and guilt are also reported. Joy was the most frequent emotion reported by women (one-third reporting memories of joyful experiences); shame and guilt appeared about three times as often in memories reported by women as those reported by men; women also remembered a large percent of experiences that had angered them. Men on the other hand reported a larger percent of remembered fearful experiences. Kamaryt (191), studying the earliest memories of seventh-grade pupils, found that in 80 percent of the 149 answers the recollection was accompanied by a strong emotional tone and half of these were unpleasant, including fear, shame, anger, etc. In the study by Dudycha and Dudycha above, fear was recorded as being associated with 39.5 percent of the memories, anger 8.5 percent, sorrow and disappointment 4 percent. Neither of these studies support the Freudian theory of memory of the pleasant.

Another experimental attempt to explore the validity of certain psychoanalytical theories was the study of memory in relation to successful and unsuccessful activities made by Rosenzweig and Mason (281). Immediately after completion of a series of jigsaw puzzles each child was asked to name all the puzzles and to indicate which ones he liked or did not like, and which ones he felt he had done well. No general tendency was found regarding memory of successful and unsuccessful achievements. The children with highest mental age remembered successes better but so also did the children whom the teachers rated highest for pride. What the relative influence of these two factors might be, the authors do not state.

Imagination

Several studies have dealt with children's fancies and make-believe. The studies have reflected an interest in developmental sequences in the growth of imagination and they have shown a promising trend in breaking away from stereotyped tests that reveal little concerning the child's inner life. They have recognized the significance of a child's imaginary activities as a clew to his social and emotional adjustments and to the educational opportunities that inhere in a child's imaginary tendencies. Although the studies have provided many significant glimpses, research in the field of childhood imagination has barely scratched the surface, and this topic holds alluring possibilities for further study.

Markey (227) studied the development of make-believe through observation of fifty-four preschool children during their free play and by means

of experimental situations. Categories were devised for the analysis of various forms of imaginative play and the children were studied from the point of view of their versatility and originality in make-believe activities. This study has more than usual interest for teachers of young children in that sequences in the development of imaginative activities of children from twenty-four to fifty months were described. The observations also revealed many situations in which a teacher might profitably make use of a child's make-believe interests for practical educational purposes. The results of this study showed that a single method of studying imagination is likely to be quite inadequate in giving a picture of any individual child; that the same test of imagination is not equally valid or adequate at all age levels; that sex differences change in relation to the make-up of any particular group of children; that imaginative behavior seems to be related to the methods used in different nursery school groups. In short, this study points definitely to the error of generalizing about the behavior of preschool children from a study based upon any one group of children. It would therefore be interesting to know whether Shallit's findings (299) that five children were responsible for 80 percent of the make-believe play of a group of ten nursery school children would be substantiated in other groups.

The development of creative imagination as expressed in drawings of children between five and seven was studied by Grippen (163) who analyzed children's drawings, evaluated their art exercises, and obtained ratings by teachers and other observers. According to the results, creative imagination as shown in children's drawings rarely functions below the age of five.

That a child's behavior in a make-believe situation may reveal his interests and private feelings has been recognized in psychiatric practice. Levy (206) described behavior of children, all of whom had younger siblings, in a play situation in which dolls representing a mother, a baby, and a younger sister (or brother) were used to bring out the child's reactions of jealousy and sibling rivalry.

The prevalence of imaginary playmates among children is indicated in several studies. Hurlock and Burstein (179) obtained information from 701 high-school and college students from fifteen to forty years of age and found that 31 percent of the females and 23 percent of the males reported having had an imaginary playmate during childhood. Svendsen (315), however, found through interviews that among 119 children over four years of age only 13.4 percent had imaginary companions, while in Jersild and others' interview study (186), one-third of the 400 children reported them. The most frequent time for the appearance of the playmate according to Hurlock and Burstein was between five and seven years for girls but after ten years for boys; but Svendsen reported this first appearance at about two and one-half years. Svendsen stated that the make-believe quality of the companion was recognized at about five

to six years. Hurlock and Burstein stated that the phenomena was more frequent and vivid with boys than with girls. Jersild found it more often with brighter than duller children. Hurlock and Burstein stated that in certain aspects of family background and activities of children the people who had imaginary playmates did not differ materially from those who did not have them. Svendsen reported that thirty-five of the forty children showed personality difficulties but seven of them were described as leaders. Friedmann (151) concluded that the creation of an imaginary person coincides generally with an event arousing a feeling of inferiority within the child.

Technics for the study of visual eidetic imagery at the preschool level were developed by Peck and Walling (264). They found eidetic images somewhat more frequently among their preschool subjects than among children of school age. Teasdale (316) found eidetic phenomena more frequently among the younger subjects in a group of 173 ten- to fourteen-year-old boys, and obtained indications that there were two types of eidetic image—one which is very prevalent among young children and decreases with increasing age, and one which is not so rich in detail, which does not show such marked divergence from normal after-images, and which becomes more frequent with increasing age up to fourteen years. Meenes (234) inferred from a study of 100 negro school children that the so-called eidetic image seems to have little relation to imagery and is largely a peripheral phenomenon. Other studies include an investigation of normal children by Marzi (230), an investigation by Bonte (104) of eidetic imagery in relation to suggestibility, and by Rieti (275) of visual eidetic tendencies in children afflicted with mental diseases.

Attention

The amount of time a child will spontaneously devote to a project continues to be a matter of interest to research workers. The findings in this field indicate, in general, that a child's capacity for concentration improves with age; but the span of concentration will be influenced to a large extent by the nature of the situation in which the child is observed. It is, therefore, difficult to derive general educational principles from the data that are at hand. Nevertheless, such findings as are available do offer some suggestions regarding the timing of projects in child training.

K. A. Miles (241) studied sustained visual fixation of preschool children to a delayed stimulus. The child was asked to watch a Jack-in-the-box until it opened, and the experimenter timed the child until he first looked away. The subjects were fifty-eight children aged two to six. The mean fixation time at three and four years was 8 seconds; at five years, 16.8 seconds; at six years, 27.5 seconds. The differences approached statistical significance. The findings also suggest that a brighter child at a given age will be somewhat more capable of sustained attention than a duller child, but this trend was not conclusive.

Van Alstyne, in a study referred to elsewhere (322), recorded the amount of time children at different ages devoted to a given activity during play. There was an average rise of approximately 2 minutes at each age level from two to five years; the means rose from 6.9 minutes at two to 12.6 minutes at five years.

Shacter reported three studies (296, 297, 298) in which measurements were made of the time during which the subject will continue an activity of his own accord under experimental conditions involving both simple and complex tasks. She found that there was little difference in time of sustained attention in the three-, four-, and five-year groups, and that preschool children may be expected to sustain attention within a range of from 8 to 12 minutes, depending on the complexity of the task. Children who were rated as extrovertive by their teachers (Marston Scale) exhibited shorter attention spans than did children rated as introvertive. She found little correlation between intelligence and sustained attention time in simple situations and a higher correlation between intelligence and attention to more complex situations. Bestor (101) studied attention span as distinct from duration of activity. Analysis of overt behavior and of verbal comments indicated that significant variations in behavior do not appear in a score for attention based merely upon the amount of time spent.

Perception and Concepts

The development of perception, and especially visual perception, has received much attention in research studies. These have dealt in considerable detail with the age at which children can discriminate forms and patterns, and to a lesser extent with the developmental sequences that underlie the growth of perception. There has been an increasing number of studies that deal, either implicitly or explicitly, with issues in perception suggested by the principles of Gestalt psychology. Findings have not uniformly conformed to what would be expected in the light of Gestalt principles. The study of perception is still in the process of laying a groundwork of facts, drawn from various angles of approach, which may eventually become integrated into a body of knowledge that will have direct educational implications.

Peckham (265) used a non-verbal adaptation of the Snellen Test in a study of nineteen children aged twenty-one to sixty-two months, and concluded that children of this age group have visual acuity similar in range to that of adults. Gellerman (156) studied form discrimination in two chimpanzees and two two-year-old children. Children learned to discriminate much more rapidly than did the chimpanzees. The author concluded that the children were able to discriminate form per se. Skeels (302) studied form discrimination by means of a conditioning technique in an investigation of forty-one children aged fifteen to forty-six months. A form was presented with a cookie underneath; and subsequently changes were made in the position of this form among other forms which did not

have the cookie. In this study children under two years did not show evidence of form discrimination. Genetically, the ability to discriminate form seemed to appear before the ability to see the relationship between two units of the same form.

Abel (87) compared normal children (aged nine years and above), subnormal children, and adults in estimations of extent in horizontal plane. The adults were more accurate when judging by tactual impressions than when judging by visual impressions, while in children the difference between the two sense modalities was not so marked. W. F. Smith (307) studied direction orientation in children (four to eleven years) and adults by means of an instrument, resembling a compass dial, which was placed before the blindfolded subject. Four- and five-year-olds were found to be poorly orientated to the cardinal points of the compass. The greatest gain appeared at the ages of seven and eight. The experiment failed to disclose any evidence in support of a vestigial sense of direction. The author concluded that "... (this ability) is learned over a period of years."

Hartmann and Triche (166) compared the responses of adults to eight common laboratory illusions with the responses of first- through sixth-grade children. Individual differences exceeded the influence of chronological age as such. The authors concluded that it was impossible to find characteristic differences such as should be found if children's figural perceptions are really independent of spatial position, as certain authorities maintain. N. E. Miller (243) studied the relative potency of specific as compared with configurational cues in the perceptions of ninety-eight children aged one to thirteen years. The children were asked to find a toy hidden in a varying array of boxes, after a screen had momentarily been interposed. Position was dominant over color and configuration at the youngest levels, but the latter became dominant over position at an earlier age than did color. A series of experiments that compared the potency of a specific color with a configurated cue did not conform to findings that would be deduced from the Gestalt principle that configurational relation is a more primitive cue than absolute relation. It is concluded that if the configurational factor as a cue comes into conflict with a specific color, the latter is dominant with the younger children and more dominant the younger the children. Batalla (93) employed pre-school and school-age children as subjects in an investigation which used a body-maze to study "insightful" behavior. The children tended to react to the maze pathways as separate units, without a grasp of the total pattern or field relationships, even though the situation was regarded by the author as one that offered opportunities for "insightful" behavior. The observed behavior was only rarely suggestive of insight, ideational response, or "structured" response.

Children's perceptions as revealed by their drawings were studied by Hurlock and Thomson (178); 248 children aged four to eight years drew pictures of a man, a girl, a house, and other objects. It was found

that the tendency to perceive the specific rather than the general and the tendency to perceive details, background, and color placement increased with age.

Several studies have provided stray glimpses of the mind of the child as revealed by the development of concepts and modes of thought. Many studies agree in showing that the child is slow in developing general concepts of identity, relationship, and causality. There is not a common agreement, however, on the question as to whether the thought processes of the child are essentially different from the thought processes of adults.

The notion that the child goes through a primitive, animistic stage of thought in the development of reasoning was not supported by findings obtained by Mead (233) who made an investigation of the thought of primitive children with special reference to animism. The methods of study included observations of children, analyses of drawings, interpretations of ink blots, and the use of questions designed to provoke animistic responses. The subjects were children of the Manus tribe. The findings indicated that the children of this tribe not only showed no tendency toward spontaneous animistic thought but they also responded negatively to explanations couched in animistic terms rather than in terms of practical cause and effect.

The development of the preschool child's concepts of relationship of time, space, number, part-whole, discordance, and cause was investigated by Grigsby (162), in a study of eighty-three children aged two to eight years, by means of questions dealing with the various relationships. In the relation of time there was progression with age through the successive steps, "I don't know," being told, recognition of a contiguous incident, a series of incidents, and the telling of time by the clock. Developmental differences were also noted with respect to other relations. Ability to identify relations was found to be influenced by the child's degree of empirical familiarity with the situation. Four stages appeared in the development of concepts of causal relations. Mental age played a noticeable part in the maturity of concepts. The development of abstract concepts of magnitude was studied by Thrum (319) by means of various series of objects similar in form but differing in size. The subjects were thirty-four two- to five-year-old children. Children were found to be more familiar at first with *big* and *little* and had most difficulty with the concept of *middle-sized*; age differences were not marked, nor were judgments significantly influenced by the form or order of presentation. Children who were retested after a summer vacation showed improvement. According to Rostohar (284) such terms as "dog" or "bird" do not mean to the preschool child the general idea but the concrete object, and the idea of common kinds and classifications does not arise through abstraction from a series of concrete objects.

Claparède (119) discussed the consciousness of similarity and dissimilarity in the child. He reiterated the view that the earlier and longer an automatic reaction has operated, the longer will self-consciousness

regarding it be delayed. Consciousness of a condition arises when habitual reaction fails. Consciousness of differences comes earlier than consciousness of similarities to which reactions have become automatic.

Lacey (197), with 450 subjects from the first three school grades, studied children's concepts of the social world of people and things by means of questions and 125 concepts as depicted by pictures (e.g., "show me the one that brings letters"). Correct answers increased steadily from grade to grade. Concepts of food, clothing, and shelter were quite clear; concepts of distant lands and earlier times were full of errors; concepts of animals, insects, and plants were not clear. Second and third graders differed less than second and first graders. Personal relationships were not grasped as easily as facts about objects.

Becher (95) probed children's understanding of concepts such as sickness, death, mind, etc., by questioning seventy-six five- to fourteen-year-old children. There was evidence of developmental sequences, the main stages of which ranged from mere statement of conditions and consequences, through religious and magical theories, to realistic notions. Children's concepts as revealed by their wishes and ambitions were studied by Jersild, Markey, and Jersild (186) through private interviews with 400 children aged five to twelve. Younger children tended to wish for specific things, while older children phrased their wishes in more inclusive terms. In answering the question as to what changes they would like in themselves if they could be changed, only a small proportion showed a critical insight into their own powers and limitations.

Restorff (273) studied children's understanding of a pictorial situation by asking five- to eight-year-olds to describe and then to imitate little scenes. The principal types of imitation noted were: (a) the child glances briefly at the picture and then imitates only a part, such as an attitude of the hand or arm; (b) he makes a methodical analysis of details, tries to imitate the model constructively; and (c) he grasps the significance of the picture as a whole and acts it out in an understanding way.

Findings obtained in a study by Dysinger and Ruckmick (135) of the emotional responses of children to motion pictures incidentally throw some light on children's concepts and interests. Psychogalvanic and pulse records were obtained while children watched motion pictures. It was found that younger children did not perceive pictures as wholes but as numerous separate incidents. Adult reactions did not give a valid criterion of the reaction of younger children. Reactions to danger and conflict were greatest in children, and especially in boys, under twelve; whereas at the sixteen-year level love scenes elicited the greatest response.

Studies of the development of perception and of concepts have been reported also by Lichtenberger (207), Rostohar (283), Meyer (240), Luh and others (214), Bognar (103), and Hanfmann (164).

The subject of suggestibility in children, which is of interest in con-

nection with the topic of children's concepts and attitudes, has received attention in three investigations.

Messerschmidt (239) studied the suggestibility of boys and girls between the ages of six and sixteen years by means of eleven suggestion tests including lines, forms, odors, colors, etc. He found the highest suggestibility at seven years with a regular lessening with the older age groups. Girls average slightly higher than boys and exceed boys at eight of the eleven ages. The same author (238) studied the responses of 194 boys between five and sixteen years of age to Hull's Postural Suggestion test, in which the examiner gave suggestions such as, "You are falling forward. You can't help yourself. You are falling forward." In this study the most suggestible ages were six and eight years. Suggestibility increased from five through eight years with a gradual decrease from eight on. Only three of the subjects failed to respond negatively or positively during one of the two suggestion periods, while no one remained completely unaffected. The younger children (five through eight years) were slightly more suggestible in the second period of the test but the older children were more suggestible in the first period.

In an effort to clarify certain ambiguities concerning the nature of suggestion as related to hypnosis, Hull and Forster (177) studied orphanage boys aged ten to eleven years by the Binet tests of progressive weight and progressive lines. There were indications of a decided negative effect on suggestibility with increasing practice. On the other hand, the perseverational or immediate practice effects from trial to trial for each day showed a slight tendency toward greater suggestibility.

Moral Judgments.

The degree to which a child at a given age level understands rules of conduct, is able to generalize what he has learned in specific situations, and is able to grasp standards of morality represents a problem that not only is significant for character education but also arises as a practical concern in the daily home guidance of the child. It seems that children are called upon to be "moral" long before they have much insight into the what and why of right and wrong. The problem as to the most effective methods of promoting moral understanding has received less attention than the question as to what the normal child actually does understand.

In a study of the moral judgment of the child, Piaget and others (270) questioned children aged four to fourteen years regarding such matters as rules of the game, adult constraint, ideas of justice. Stages in reaction to rules ranged through simple individual regularity, imitation of seniors, cooperation, codification. Up to seven or eight years a majority of the children subordinated justice to adult authority. From eight to eleven years there was progressive equalitarianism, and from eleven or twelve on, the majority of children believed in a qualitarian justice tempered by consideration of equity.

Harrower (165) reported results which not only are rather challenging to Piaget's conclusions regarding stages of moral development, but which also suggest that a question might be raised with regard to the stages discovered by Piaget in other studies of childhood thought. Harrower repeated Piaget's study of moral concepts with some modifications. Findings obtained with a group of children selected to correspond to the group used by Piaget were similar to Piaget's results. But with another group of children, from well-to-do homes, the results were quite dissimilar. Harrower suggested that either (a) the stages of development which Piaget has been emphasizing possibly are not a universal characteristic of development per se, but are found only within certain select groups, or (b) in certain environments these stages can be so far accelerated that children exhibiting characteristics of the third, and most developed stage, are to be found at the ages of the first.

A practical note was struck by McGrath (218) in a study of moral concepts by means of questions put to 1,218 children aged one and one-half to seven years. Understanding of the act of obedience appeared in isolated cases as early as one and one-half years and the concept of the why of obedience as early as three and one-half years; two-thirds of the children appreciated the necessity of the act of obedience at four years but only about half appreciated the why at seven years. Questions such as "If you broke mama's sugar bowl, what would you do?" "If mama asked you who broke it, what would you do?" were used to probe concepts of courage, honesty, and justice. According to the criteria used in the study, these concepts had appeared in over half of the children at six years. The questions dealt also with concepts of ownership and familial responsibility. It was concluded that all the moral concepts under consideration, with the exception of the why of obedience, are within the grasp of the average preschool child.

Other studies of ethical and moral concepts have been reported by A. Frank (146), Illge (181), Kinter (193), and Schneckenburger (294). A study by Schilder and Wechsler (292) deals with children's ideas about death.

Attitudes of preschool children toward their own bodies and the bodies of others were studied by Dillon (130). Thirty-eight nursery school children were observed. The predominant attitude exhibited by children under three and one-half years toward their bodies, and toward the bodies of children of the opposite sex when undressed, was the same as when dressed. The younger group did not differentiate between sexes. Children aged three to five showed more definite awareness and interest, but exhibited no sense of impropriety. A study by Canivet (113), based upon answers to a questionnaire, has shown ways in which sexual attitudes and adjustments may be influenced by the manner in which enlightenment regarding sex is given to the child.

Minard (245) probed the attitudes held by 1,352 seventh- to twelfth-grade children toward the people of other races. Questions were raised

such as, "Would you dance with an Italian girl?" and these were scored on a scale ranging from complete absence of race prejudice ("Yes, certainly!") to the undoubted presence of such prejudice ("No, certainly not!"). Little difference was found between boys and girls; scores in tolerance improved from the seventh to the tenth grade, with little change thereafter. Desirable race attitudes did not show much relationship to socioeconomic status but were positively related to intelligence although not to a definitive degree. In an investigation of the development of race consciousness, Lehrer (204) studied forty-three New York Jewish children. Until the fourth year, the children showed no consciousness of belonging to the Jewish group. Between four and five such consciousness took the form of an attachment to a larger sphere in which the family was living; later it became expressed in terms of religion, language, and mores.

That motion pictures may have a pronounced effect on children's social attitudes was found by Peterson and Thurstone (268). Tests of attitudes toward nationalities and races, toward crime, criminals, and prohibition were made before and after the children had seen various films that might be regarded as prejudicial in one direction or the other. Changes in attitudes appeared on tests administered soon after the pictures had been seen and continuing effects could be detected after intervals of from two and one-half to nineteen months.

Esthetic Judgments

Studies of the development of esthetic tastes continue to accumulate and in time the isolated findings in this field will no doubt suggest generalizations that will have significant educational implications. Many of the studies are based on children's choices or preferences with only a few dealing with the products of children's constructive activities.

The influence of familiarity upon children's preference for pictures and forms was studied by Mendenhall and Mendenhall (237). Children were asked to judge pictures and poems as good or poor and some of the materials were then presented many times. In general, pictures and poems that were liked grew in favor when presented many times, while those that were disliked grew in disfavor; there were, however, exceptions to this rule.

Children's choices in poetry were studied by Mackintosh (220) who used 400 poems in an investigation of children in grades three through six. The results indicated that literary merit in the accepted sense is not a criterion of the value of a poem to children; children's choices are determined more by the poem's application to real or vicarious experiences. There were variations from grade to grade but some poems were commonly liked by all grades and some were commonly disliked.

Bailey (91) took photographs of block constructions made by fifty-four two- to five-year-old children and had the constructions rated by adults. The results showed that ability to plan and carry out a design

increases with age and that with age the designs tend to become more symmetrical and the blocks placed more carefully.

Investigators are still trying to find out what colors children prefer, but there is lack of agreement still. It may be that the question cannot be answered in terms of color alone but only as color is related to other influencing factors in any situation. In a study by Staples and Walton (311) it was concluded that red and yellow are originally preferred colors in infancy and that blue and green grow in favor with increase in age. In a more extended study by Garth and Porter (155) the color preferences of over a thousand children ranging in age from one to nine years were examined. Yellow was found to be the least popular color; red stood high in all age groups; blue tended to be more esteemed with increasing age.

Children's sensitivity to color harmony was probed by Walton (327). Sensitivity to color harmony was found in a few children as early as the fourth year; there was a relationship between age and scores made by the children; color harmony scores were not appreciably affected by intelligence, time spent on a test, or single color preferences. Children who were rated high by teachers with regard to general artistic ability did not rank significantly higher in sensitivity to color than children ranked as non-artistic, by means of a technic developed by Williams (332) who used varied colored scarfs in conjunction with dolls wearing a dress of a certain color. Over 6,000 drawings by individuals ranging from the pre-school level to adult years were examined in a study by Graewe (160). The results were judged and classified in terms of conceptual drawings, spacial arrangement, and other factors. Children's esthetic tastes were tested by Bulley (109) by means of nine pairs of contrasted household articles paired from the point of view of good and bad in esthetic value.

Other studies dealing with the development of esthetic reactions include a study by Whorley (331) of children's sensitivity to compositional unity; by Daniels (125) of discrimination of compositional balance; by Jasper (183) of children's sensitivity to graphic rhythm; by Mellinger (236), and by Olney and Cushing (256) of children's interests in pictorial materials; by Tiebout (320) of psychophysical characteristics of artistically superior as compared with inferior children; and by Rodgers (278) of the relation between artistic ability and the environment.

Children's Interests

Several studies have dealt with children's interests as revealed by play activities and choices of play materials. The topic of interests is obviously important from an educational point of view. On the whole it may be said that research in the field of children's interests, especially at the elementary-school level, has shown a decided lag in proportion to the importance attached to interests in progressive educational theory and the role that interests might play in educational practice. The study of children's interests, with an eye to their utility in guidance and education, offers one of

the most promising and timely areas of research in educational psychology.

Investigations of children's toy preferences at the preschool level have revealed certain general trends. It appears that choices are influenced not only by the general class to which a given play object might belong, but also by the characteristics of the specific object. To obtain a definitive picture of the relative appeal and usefulness of various materials would therefore require a more extensive selection of materials and a more careful control of the many variables involved than have been afforded in studies that have been made to date.

Van Alstyne (322) observed the uses made of certain play materials by two- to five-year-old nursery school and kindergarten children. Blocks, clay, and the doll corner were very popular at all age levels; wagons appealed more to three-year-olds than to two-year-olds; crayons had more appeal at the age of five than in earlier years; younger children tended to play more with active than with sedentary materials, but at five years interest was divided about equally between the two types. Boys tended to choose materials that called for active play while the girls' choices tended more toward passive play. The study also showed the degree to which various materials stimulate social as distinguished from non-social play. Benjamin (100) examined the toy preferences of 100 children aged four-teen to seventy-six months by means of tests which utilized six toys which were similar in size, color, and cost. A car was chosen considerably more by boys while dolls were chosen more often by the girls. It was not possible in many instances to predict a child's final choice from the amount of time he spent playing with different toys. Vance and McCall (323) studied preschool children's preferences among play materials by the method of paired comparisons of pictures. Interest in clay and house-keeping material was high at all ages; boys tended to show higher preferences for materials requiring larger muscle activity, while girls tended more in the direction of housekeeping materials and materials for more passive play—a tendency which appeared also in Van Alstyne's study. In a study by Manwell and Mengert (225) boys likewise were observed to exhibit somewhat more physical activity in their play than girls.

Children's play in the home environment was studied by M. P. Roberts (277). The study analyzed uses made of play materials, varying types of parent participation in children's play, and various types of play activities. This study has interesting practical implications for parents.

Children's interests in collecting were studied by Durost (134), who obtained information from 918 ten- to fourteen-year-old children by means of questionnaires and interviews, and by Witty and Lehman (333), who presented checklists containing 190 items to several hundred town and country children in grades two to twelve.

Bright children were found by Boynton and Ford (105) to spend more time per day in play than dull children; dull and bright children spent practically the same amount of time in physical play; but in mental recreations, the bright exceeded the dull to the extent of almost an hour per day.

CHAPTER III

Motor Development from Two Years to Maturity

BAYLEY (336) presented the results of a seriatim study of a group of children retested on the California Infant Scale of Motor Development from birth through thirty-six months of age. The infants originally numbered sixty-one; the number measured at any one month from eighteen to thirty-six months ranged from forty-four to fifty-three. At the latter ages the tests were given at three-month intervals. The scale, presented in the appendix to the monograph, contains seventy-six items ranging from 0.2 months to 50.0 months. The reliabilities, based upon split-halves, ranged from .74 to .86 at ages eighteen to thirty-six months. Correlations between retests were low as between eighteen and twenty-one months and between twenty-one months and twenty-four months (.28 and .26), but were considerably higher thereafter (.61 to .75). The combined sigma scores for ages eighteen, twenty-one, and twenty-four months did not correlate very highly with the combined scores at twenty-seven and thirty months (.43) or at thirty-three and thirty-six months (.37), but the scores of the latter two correlated with each other (.73). There was little relationship with mental ability, body build indexes, and mid-parent education, although an earlier study had shown that mid-parent education was as highly related to mental ability of these children as it is customarily found to be at the school ages. Why mental ability correlates only .14 to .27 with motor ability at ages twenty-one to thirty months and then suddenly rises to .51 at thirty-six months is not explained.

Further light on the question as to whether there is a general motor ability in young children was furnished in a recent study by Goodenough and Smart (343). They presented interrelations of a number of motor abilities of 154 children, divided into four groups, carefully selected so as to give a minimum age range within each group. All children were tested at the period midway between their annual birthdays, that is, at ages two and one-half, three and one-half, four and one-half, and five and one-half years. The maximum variation was one month in either direction. The tests used would seem, on *a priori* grounds, to be quite similar, all involving the element of speed and all but one requiring eye-hand coordinations which appear similar. They were: finger tapping, stylus tapping, three-hole test, needle threading, simple reaction, and a walking path test. The reliability coefficients were, for the most part, "encouragingly high when the short time-allowance for the various tests is taken into account." All but four of the twenty-five reliabilities reported were above .80. Yet the intercorrelations were low, at no point exceeding .54 and for the most part approaching zero. Application of the Thurstone method for factor analysis revealed the existence of at least one common

factor running through all of the tests and indicated the probability of one or more group factors entering into several of them. The common factor was thought to be something analogous to general motor maturity. The second factor was thought best described as attentiveness or carefulness. These logical inferences should be accepted with some caution, however. For example, the fact that the three-hole test was difficult and uninteresting, young children therefore being less inclined to put forth their best efforts, was used as an explanation for the low factor loading of the first factor at age three and one-half, but this same test had the highest loading of the second factor (attentiveness or carefulness) of any test at age three and one-half.

The curve of motor development and the motor profile of school age children was discussed by Yarmolenko (354). His conclusions were based on a series of tests given to thirty children of each sex in fourteen groups, ages eight to fifteen years. The tests included speed and exactness of walking, grasping and relaying objects, lying down and getting up, ball throwing, standing jump, strength, and motor endurance. There were three stages in the motor growth curve: (a) a negative acceleration in the ninth and tenth years; (b) a positive acceleration at ages ten to twelve for girls and ten to thirteen for boys; and (c) with the approach of puberty a second period of retarded development more evident for girls than for boys.

Special Abilities

A number of investigators have presented scores on separate motor abilities by age groups. Among them may be mentioned Johnson (344) who presented results for 120 children ages four to ten years on throwing a feathered dart at a target, for 360 children three to eleven years on steadiness of right hand, and for 239 children four to eleven years on speed of tapping; Cowan and Pratt (337) who tested 540 children ages three to twelve on a hurdle jump; and Goodenough (342) who studied the speed of tapping of 240 children two and one-half to five and one-half years of age and of thirty-two kindergarten children.

Influence of Motivation

Chase (118) found that the amount of motor energy expended by young children was affected by external incentives. More energy was expended under praise, reward, punishment, and reproof than under conditions of control motivation. Motor energy was measured by a specially constructed type of motivation dynamometer. The subjects were 259 children ages twenty-four to ninety-six months.

Motor Learning

As an outcome of a study of the relative effectiveness of visual guidance versus manual guidance in the motor learning of young children, Melcher (235) developed the hypothesis that ability to use kinesthetic cues

as the sole guidance in learning develops with age instead of retrogressing. Twenty-one children thirty-five to fifty-seven months of age were divided into three groups who learned to trace a maze under three conditions of guidance: visual and manual guidance, vision alone, and manual guidance without vision. The method of training in which manual guidance without vision was employed was much less effective in producing successful learning by these children than were the visual methods.

Beebe (98) contributed tentative evidence on the nature of motor learning of eight children fifty-two to sixty months of age who attempted controlled aiming under conditions of prismatic deflection.

Influence of Practice

Viteles (352) concluded that initial scores on tests of short duration may lead to gross errors in the diagnosis of individual motor ability. His subjects were ninety-six children fifteen to eighteen years of age who were tested on the Stenquist mechanical assembly test, Minnesota paper form-board, O'Connor wiggly block, serial discriminator, spool packing test from the Stanford motor skills unit, and Roberts' obstacle test. Two hours of practice on the serial discriminator and spool packing brought about considerable change in the relative positions of individuals. Mattson (232) showed that the effects of practice were a function of the complexity of the task. Negligible differences were obtained on a maze of simple pattern, greater effects on a pattern intermediate in complexity, and still greater effects on the most complex pattern. The effects were retained over a two months' rest period. Subjects were fifty preschool and kindergarten children.

Identical twins were found by McNemar (347) to resemble each other more closely than fraternal twins. Forty-six fraternal twins and forty-seven identical male twins of junior high-school age were tested on pursuit rotor, steadiness, speed drill, spool packing, and card sorting. The author thought that heredity was the most plausible explanation for the greater resemblance of identical twins. Practice on the pursuit rotor and spool packing increased the resemblance of fraternal twins but did not change the resemblance of identical twins.

Relation to Mental Ability

The low relationship usually found between mental and motor ability was further substantiated by Bayley (336), McElwee (346), and Nemzek, Cronin, and Brannom (348). In a group of subnormal children, Attneborough and Farber (90) found a somewhat higher relationship between mental ability and manual dexterity and between mental ability and mechanical ability than that usually obtained within normal groups.

Relation to Physical Condition

A review of the literature on the influence of disease upon motor development during childhood prepared by Abramson (335) appeared in the

Psychological Bulletin in 1934. The net result of this survey seems to be that very little is known about the effect of disease upon motor abilities. Long (345) showed that the motor abilities of deaf children were not greatly different from those of hearing children of the same race, age, and sex. His experimental group was composed of eighty-nine Jewish children eight to eighteen years of age in an institution for deaf mutes. These were compared with a control group taken from an orphan asylum. The tests were spool packing, serial discriminator, pursuit rotor, tapping, motility rotor, dynamometer, and balancing board.

Relation to Personality

Cowan and Pratt (337) claimed considerable clinical value for their hurdle jump test in uncovering slight motor retardations which were affecting the personality and social adjustments of children. Often the motor difficulties had gone unnoticed by parents and teachers but were of very real significance, so the authors thought, in the child's adjustment and personality. In view of the specificity of motor abilities usually found, it is surprising that a single test such as the hurdle jump should reveal motor retardations that seem to be of such fundamental importance.

Westphal (353) found no differences between stutterers and non-stutterers. Twenty-six stuttering boys ages eight to seventeen years, with intelligence quotients 72 to 127, were matched on chronological age, intelligence, and race with a group of non-stutterers. There were no significant differences in strength of grip, bead tossing, Seguin form-board, simultaneous writing of digits, or steadiness.

Racial Differences

Eells (340) found that Eskimo, Aleut, and Indian children in Alaska were inferior in mechanical and motor ability to the norms given for American children. Five hundred and ninety-one children ages ten to twenty were given the MacQuarrie test for mechanical ability and 463 were given the Brace scale of motor ability. There were no sex differences in mechanical ability, but the boys were distinctly superior to the girls in motor ability. The motor scores for the boys closely approximated the norms for American children. There was no increase in the girls' scores with age.

Handedness

Differences in degree of use of the preferred hand by children two to six years of age were found by Updegraff (351). The same investigator, in a later article (350), did not find an invariable correspondence between preferential handedness and eyedness. Right-eyed children were usually right-handed, but right-handed children were not necessarily right-eyed. The correspondence between eyedness and handedness in left-handed

children was less. Eyre and Schmeeckle (341) found that 86 percent of 280 junior high-school pupils showed correspondence of eye, hand, and foot preference. The correspondence between hand and foot preference was greater than that between eye and hand or eye and foot. Crider (339) demonstrated that the percent of eye preference varies with the opportunities for sighting. When only one opportunity is given, the subject must be classified as either right-eyed or left-eyed. When forty-five opportunities were given to a large group of elementary-school children, inconsistencies in sighting were found in 50 percent of the subjects.

Trends in Recent Investigations

The investigations on motor development during the years 1932 to 1935 have been much in line with previous investigations. Further material has appeared confirming the specificity of motor abilities, particularly of the finer eye-hand coordinations, but the search is still going on for the elusive common motor ability, aided by the newer developments of the tool of factor analysis. A hopeful trend towards a better understanding of motor abilities is the appearance of seriatim studies and of genetic studies of the same abilities over a fairly wide age range.

During the three years little or no attention has been paid to the effects of systematic training (guidance and instruction on how to improve) at the preschool or school ages, but the effects of repetitive practice have received some consideration.

As previously, almost nothing has appeared that contributes to a better understanding of the significance of motor abilities in the life of the child.

CHAPTER IV

Physical Growth from Birth to Maturity

THE SCOPE of this review of research in physical growth is restricted in three directions. First, only investigations published during the triennium September, 1932, to September, 1935, are reported. A review of research published prior to this period appeared in April, 1933. Secondly, attention is confined to studies made by American investigators. Researches contributed by workers of other countries are considered neither irrelevant nor unimportant, but the international literature is too voluminous for even cursory treatment in a single chapter. Finally, consideration is limited to studies carried out on physically normal human subjects ranging in age, for the most part, between birth and the end of the second postnatal decade.

Research Technic

Selection of sample—Boyd (372) discussed factors in the selection of an adequate sample for determining normal variability at successive ages in the weight of internal organs. She showed that, in order to avoid the error inherent in pathologic data, it was essential that subjects included: (a) had died from an accidental cause; (b) had been ill less than twenty-four hours; (c) had showed no symptoms of disease either before injury or at post-mortem; (d) had not suffered gross hemorrhage prior to death; and (e) had not died as a result of poisons known to influence the weight of organs.

Position of subject, location of landmarks, method of measurement—An experimental approach to the location of the nasion in the living was made by Ashley-Montagu (357). Preliminary study had suggested that this landmark was situated "at the point at which a horizontal tangent to the highest points of the superior palpebral sulci intersects the midsagittal plane" (357:92). This hypothesis was tested on 115 adult cadavers of both sexes and ten adult living males. The procedure with the cadavers was to bore a hole vertically through the soft tissues at the point postulated, to dissect the naso-frontal region of the head, and to observe whether or not the gimlet had penetrated the skeletal nasion. With the living subjects, a piece of wire was passed across the postulated point and lateral roentgenograms taken. The results were striking. The gimlet was found to have exactly pierced the nasion for 112 of the 115 cadavers. For the living subjects, in no instance did the fleshy landmark fail to coincide with the bony landmark. The investigator noted that "in those groups of mankind in which an epicanthic fold is normally present in the palpebral region, or in those individuals in whom the skin droops over the superior palpebral sulci, the method of locating the nasion here

described cannot be applied" (357:90). Further, the general finding of a constant relation between the level of the nasion and that of the superior palpebral sulci must be interpreted, pending study at various age levels, as specific for the age group studied.

Bayer and Gray (361) presented a historical critique and experimental evaluation of existing methods of measuring the hand. They considered both the position of the hand and arm during measurement and the manner of taking hand measurements. The dual approach of literature analysis and experimental study of points on which authorities disagreed provided a balanced, comprehensive matrix from which to draw recommendations as to a standard position for the hand, the measurements to be taken on the living hand and the dimensions to be determined on the contour form.

The comparability of stature observations determined by two technics was studied by Whitacre (453). The technic differed only in that one required the subject to stand free on the weighing scales while the other necessitated that his heels, buttocks, shoulders, and head make contact with a vertical measuring board. Application of the two methods, in immediate sequence and by the same observer, was made for 398 school children of San Antonio. On finding that 28 percent of the group measured 1.3 cm. or more shorter when standing free on the scale than when against the board, Whitacre concluded that "little if any confidence could be placed in measurements attempting to follow the course of growth in height by the use of first one and then the other technique."

Gray (400) investigated the comparability of thoracic depth data taken with the large sliding compass (the preferred method of Hrdlicka) and with the spreading calipers (the method employed by Martin). Each method was applied on 246 white males and 131 negro males. Both series of subjects were "convicts between the age of 20 and 60 years, measured at the Illinois State Penitentiary in Joliet from 1927 to 1929." Obtained means, specific for anthropometric instrument and racial group, showed the straight-arm method to exceed the curved caliper method by 2 cm., or 10 percent. Gray considered this systematic error of sufficient size to necessitate correction before comparison or pooling of data obtained by the two instruments was justifiable. In consequence, he presented linear regression equations, treating white and negro males separately, for converting measurement values for one instrument into equivalent values for the other.

Cattell (374) proposed the sum of twelve carpal, metacarpal, and epiphyseal dimensions as an improved method of measuring the ossification of the hand and wrist. Her proposal was based on an analysis of some forty measurements taken on each of fifty-four roentgenograms distributed over the elementary- and high-school age period. The twelve measurements proposed and the criteria used in selecting these measurements were enumerated as follows (374:459-60):

The criteria for the selection of measurements to be included in the final battery were: First, that the measurements could be made objectively; second, that they were

little influenced by small changes in the position of the hand; third, that the bones measured showed a prolonged period of growth; and fourth, that the combination of measurements should give an approximately equal weight to the short bones, the long bones, and the epiphysis.

The following combination of twelve measurements appeared best to fulfill the above criteria: (1) the widest diameter of five of the carpal bones, the capitate, the triquetrate, lunate, navicular and greater multangular; (2) the length of the first and fifth metacarpals; (3) the broadest width of the epiphysis of the first and fifth metacarpals; (4) the broadest width at the distal end of the first metacarpal and the proximal end of the fifth metacarpal shaft; (5) the widest diameter of the radial epiphysis.

A method of measuring the palate in living newborns was devised by Ashley-Montagu (356). Stone casts were made from the fleshy palate and a series of length, breadth, and height dimensions on these casts were orthographically projected for measurement on an enlarged scale, five times natural size. Bakwin and others (358) described six dimensions of the ulna and radius and six measurements of the thoraco-abdominal cavity which may be determined from infant roentgenograms. The dimensions were length of ulna and radius; diameter of ulna diaphysis, radial area of thoracic cavity; length, width, and area of abdominal cavity. Stunz (441) constructed X-ray exposure tables for use in securing roentgenograms of the head and extremities on infants and school children. The twofold aim in construction of the tables was (a) "to use such exposure as will show the maximum amount of detail in bone pattern and density and the earliest nuclei of bone growth," and (b) "to give each child the minimum exposure compatible with good results" (441:694). Brief description was made of the position of the subject in taking roentgenograms of the hand, foot, and head. A more extensive and precise discussion of the position of the subject in securing roentgenographic pictures was given by Todd (455:259-62). He made orientation recommendations for obtaining the following series of roentgenograms: anteroposterior of hand, lateral of hand, anteroposterior of elbow, lateral of elbow, anteroposterior of shoulder, dorsi-ventral of foot, lateral of foot, anteroposterior of knee, lateral of knee, anteroposterior of hip, and lateral of head.

Reliability of measurements—The reliability and objectivity of stature observations taken with the subject in the erect position, with heels, buttocks, shoulders, and back of head in contact with a vertical measuring board, was studied by Whitacre (453). A sampling of 159 school children was used. Each child was initially measured by two independent observers and then remeasured by the same observers after an interval of fifteen to thirty minutes. All measurements were made with shoes and stockings removed. Results were (453:460):

One of the observers duplicated measurements on individual children to within 0.5 cm. or less, for 97 percent, the other observer, for 99 percent of the 159 cases measured: only one difference was as great as 1.0 cm. As between the two observers, there were 81 percent of the children whose four height measurements (two by each observer) differed by 0.5 cm. or less, and 98.6 percent by 0.8 cm. or less.

Supplementary analysis of the comparative reliability of stature observations taken with the child against the board and standing free on the weighing scales (twenty-five subjects being used) showed that observations at the board were duplicated to within 0.8 cm. for 100 percent of the cases. Observations standing free were duplicated to within this margin for only 68 percent of the cases.

Wheeler (452) reported reliability coefficients, based on 200 cases, of .99 for stature and .87 for weight. Stature was taken with a stadiometer and weight with the Fairbanks portable scales. Both measurements were stated to have been made as accurately as possible, shoes and coats being removed. The age range covered was apparently six through seventeen years. It appears, considering this wide range of ages and the size of coefficient obtained for weight, that the measurements were not repeated at a single examination.

"A test of the reliability of the roentgenologic technic in infancy" was made by Bakwin and others (358). They correlated the measurements of the transverse diameter of the heart in duplicate roentgenograms of thirty-six infants in the age period from thirty-two to thirty-nine weeks and obtained a coefficient of .89. The infants were supported in the sitting position by a device described by Wimberger. Seemingly the two roentgenograms were taken in immediate succession. Such a procedure, obviously, would be expected to yield a higher coefficient than if the infant was removed from standard position after one film was taken and then replaced in position for the taking of the second film. Further, the coefficient obtained must be considered specific for the measurement studied. Reliabilities for length of the thorax or width of the abdomen in infants may be of a distinctly lower order, while reliabilities for diameter of the radial or tibial diaphysis are probably higher.

In lieu of reliability coefficients obtained from repeated measurements taken during one examination period, Bayley and Davis (362:33) estimated reliabilities for nine anthropometric measurements in the following ways:

- (1) By a study of the coefficients of correlation obtained when one month's measurements are paired with those taken at the next succeeding examination period;
- (2) by the measurement of a small group of infants after an interval of one week; and
- (3) less directly, by a consideration of the consistency of the trends of central tendency for the group.

Self-correlations under method one were obtained between measurements at one and two months, at five and six months, at eleven and twelve months, at eighteen and twenty-four months, and at thirty and thirty-six months. The mean coefficients obtained for weight, body length, and head circumference were between .92 and .95; for stem length, bitrochanteric diameter, and thoracic circumference between .82 and .84; for bideltoid diameter, thoracic width, and thoracic depth between .66 and .70. The subjects were sixty-one infants of both sexes measured repeatedly over the three-year

period. While the measurement technic was not constant throughout the entire age range (as the subjects passed from infancy to childhood the position of the subject was changed from reclining to standing or sitting to standing for obtaining a number of measurements), the mean coefficients obtained are considered to rank the measurements and roughly estimate the degree of their respective reliabilities for the age period studied. Bayley and Davis also investigated the objectivity of judges' ratings of photographs by means of a seven-point scale of lateral-linear build or general "chubbiness." The photographs were taken nude and covered the same subjects and approximately the same age intervals. Correlations between the ratings of judges B and D (the experimenters) ranged from .71 to .81, with a mean of .76.

Shuttleworth (436) derived a formula for determining "the reliability with which individual differences in gains or increases or increments can be measured." In discussing the terms of the formula he noted that the reliability of increments was in part a function of the reliability of the original gross scores, in part a function of the length of the interval between initial and second measurement, and in part a function of the extent of individual differences in increments during the interval.

Analysis of data—Hellman (403) analyzed data for a series of facial dimensions with reference to dental stage rather than chronological age. In defense of this procedure he claimed: (a) that chronological age, even in yearly intervals, was too fine a time scale for studying growth in facial dimensions, since the differences between successive means for any given dimension were not three times the probable errors of the differences; and (b) that when the "development of the dentition" time scale was divided into eight to ten tooth eruption stages, a more satisfactory measure of the distance covered by the growing face was obtained.

Courtis (375) proposed that physical growth norms be derived by averaging the constants for series of integral equations of individual growth curves. Application of the method, using equations of the multi-Gompertz type, was made for twenty-five individual records giving stature, weight, and number of permanent teeth at annual intervals over the elementary- and high-school years. The derived "curve of constants" for each measurement was considered superior to the commonly employed "curve of means" on the grounds that it more nearly preserved the form of the individual trends upon which it was based. While the method is interesting, an alternative interpretation of the findings suggests itself. It would appear that the steepness of the adolescent phase of the derived normative trends, the characteristic which makes them resemble the individual curves in form, is evidence that the "curve of constants" is less representative of the group as a whole during the adolescent years (and norms are derived for application to groups) than is the "curve of means."

A method of establishing the probable limits of normal variation in the weight of organs was discussed by Boyd (371). She expressed the variability of spleen-weight data in terms of standard deviation multiples

and percentile zones, applied the Chi-square test to each method, and found the percentile method the more valid for defining the probable limits of normal variation. Rosahn (433) pointed out that the bar diagram would be more meaningful if, when used to represent graphically the mean levels of two or more series of observations on the same variate, it carried information as to the significance of the difference between the populations under consideration. Illustrative application of this graphic method of representing the significance of the difference between means was made, using stature in two groups of college men. Palmer (424) called attention to a test for determining the probability that two series of observed differences between comparable means would arise as a result of random sampling. The test is for use in situations where nearly all the averages of one population may be "insignificantly" greater or smaller than those of another (e. g., averages of weights of rural school children of different ages greater or less than similar averages for city school children).

Wallis (448) reported a regression phenomenon which he considered inherent in all indexes derived from two positively correlated dimensions. Using the cephalic index to illustrate the phenomenon, he claimed that if individuals of a local group (of like age, sex, and race) are selected on the basis of head length, head width lags as one proceeds from the lowest to the highest values of head length, that is, head breadth becomes relatively less in terms of length (448:524).

The converse is the case if we select head width as the independent variable. We then find that head length is relatively less in the widest, and relatively greater in the narrowest heads. With increase in width of head, length of head lags, and conversely.

In explanation of the lag it was suggested (448:538) :

The decreasing lag of index with increasing value of independent variable is probably due to the fact that an absolute unit of increase, such as 1 mm., bears a larger proportion to the mean of the independent variable in the lower values than in the higher and so tends to offset the increments of the dimension which is measured against it in the index which comprises the dependent variable.

Wallis' position with reference to the implications of the phenomenon (which he termed "anatomic lag") was that it must be taken into account in all comparative studies aiming to elucidate age, race, or sex factors. In regard to the latter factor he wrote (448:540-41) :

A weighting of anatomic lag is necessary in order to ascertain sex differences which are properly attributable to the factor of sex. It is, for example, commonly stated that women in a given group have a higher cephalic index than do males. They have, however, absolutely shorter heads. By virtue of the principle of anatomic lag we would, therefore, expect them to have relatively wider heads, that is, to have a higher cephalic index. In so far as cephalic index is a function of head length, it follows that the fundamental sex difference is in absolute head length. Only when the cephalic index is significantly different between males and females having the same absolute head length (or head width) would cephalic index as such be a true sex trait as distinguished from a mere biometric trait.

A composite measure of "physical age" was reported by Dearborn (383) to be in process of construction. The procedure being employed is that of (a) transmuting raw values for stature, weight, bi-iliac diameter, carpal ossification, and dentition into age values; and (b) averaging the series of physical ages (stature age, weight age, hip age, carpal age, and dental age) for each individual.

Growth in Bodily Dimensions

General studies—Central tendency and variability values for thirty-three external dimensions taken on newborn white infants at two New York hospitals were reported by Bakwin and Bakwin (359). The infants born at one hospital represented homes of moderate income while those born at the other were from poor homes. For twenty-four dimensions, the basic data were obtained from measurement of 812 first-born infants (395 male, 417 female) and 841 later-born infants (423 male, 418 female). The remaining nine measurements were made on a shorter series of cases. Means, standard deviations, and coefficients of variations were given for each dimension by sex and order of birth. With few exceptions, the mean magnitudes were larger for males than for females and for later-born than for first-born infants. Coefficients of variation showed length of thigh, circumference of head, and body length as the least variable of the dimensions studied. The most variable measurements were body weight, bi-iliac diameter, and height of nose. The distributions of weight for first-born males and females were skewed positively. Later-born infants of each sex showed approximately normal distributions.

Tentative standards for five external dimensions were presented by Stuart (440): head circumference, thoracic circumference (in plane of ensiform at mid-respiration), interspinous diameter, vertex-sole length, and body weight. The subjects were approximately 110 white children of North European stock. They were measured at eight age periods between birth and twenty-four months of age. Tables, specific for dimension, sex, and age period, gave range, 5 percentile values, mean, standard deviation, and range of ± 1 standard deviation.

Bayley and Davis (362) analyzed data for nine anthropometric measurements secured by seriatim measurement of sixty-one well-nourished Berkeley infants (thirty female, thirty-one male). The measurements were taken at seventeen ages during the first thirty-six months following birth. Central tendency analysis showed that (a) boys were consistently a little larger than girls for all measurements throughout the three-year age span, and (b) of the transverse measures studied, bideltoid diameter was largest and grew the most, bitrochanteric diameter came next in size, thoracic width (at nipple level) was third, and thoracic depth smallest. By expressing the series of means for a given measurement as percents of the mean at one month of age, the following findings were obtained: (a) weight far outstrips all other measures; (b) during the first eighteen months the

width measures increase greatly and it is not until the twenty-fourth month that the increment for height exceeds that for the three widths; (c) the first year shows practically equal proportionate growth for stem length and total length. "It is only after the 12th month that the legs begin to grow rapidly and cause relatively greater increase in the total height curve"; (d) "the dimension which shows the smallest percentage increment throughout the entire 36 months is chest depth. Head circumference shows the second smallest increment" (362:45).

A study of eighteen physical measurements obtained on 1,243 Iowa City white males ranging in age between birth and eighteen years was reported by Meredith (415). The sampling was homogeneous as to geographic location and sex, almost entirely of North European racial stock, and somewhat favored economically and culturally. A total of 93,232 measurement values constituted the data. Central tendency and variability constants were calculated for thirty-one successive age distributions of each measurement and central tendency curves drawn to the series of means for each measurement. Comparison of four curves for thickness of skin and subcutaneous tissue (at upper arm back, upper arm front, thorax back, and thorax front) revealed the original finding that all four trends were similar in form below eleven years, whereas beyond this age the two thorax curves climbed, each attaining an absolute magnitude in excess of that found at any previous age. At the same time the two upper arm curves descended, each falling to a mean magnitude at eighteen years lower than that found at any point between three months and this age. A second major finding of this study emerged when mean percent increment curves for each measurement were obtained and studied. Every measurement analyzed except the four for skin and subcutaneous tissue showed a decrease in relative growth rate during the eleventh year.

Palmer and Reed (420) studied the relationship between attained stature and annual increment in stature in elementary-school children aged six to fourteen years. The subjects were 2,414 white native-born children (1,254 boys and 1,160 girls) attending the elementary schools of Hagerstown, Maryland, during the years 1922-28. Each child had repeated annual stature measurements for four or more successive years. Analysis consisted of the calculation of means and standard deviations of distributions of annual absolute gains. In preparation for this analysis the subjects were grouped into age and sex specific classes and further separated into subgroups containing only individuals of the same stature to within one inch. Major findings were (420:327-34):

1. For girls, average annual rates of growth in height decrease regularly from the 6th through the 9th year, and are independent of attained height.
For boys, mean annual rates of growth in height decrease regularly from the 6th through the 10th year of age.
During these years "children, regardless of their actual height, grow like other children of the same age and sex."
2. During the 9th and 10th years, girls above 51 inches in height appear to grow more rapidly than those less than 51 inches.

Between the tenth and eleventh years, boys above fifty-two or fifty-three inches in height grow more rapidly than the shorter ones. In general the adolescent acceleration of growth in height appears synchronized with actual height and tends to occur at certain points on the scale of height, i.e., fifty-one inches for girls and fifty-three inches for boys.

It was concluded that in the years immediately preceding the adolescent acceleration there was practically no association between average gain in height and attained height, while with the onset of the adolescent acceleration there was a definite and direct association between annual increments of height and height itself.

Boas (368) analyzed seriatim stature observations with reference to year of maximum adolescent growth. The subjects were 483 Horace Mann School girls, between the ages of nine and sixteen years, and 566 Newark Academy and City College boys, ranging in age from eleven to seventeen years. It was found:

For girls, the mean age of maximum stature increase was 12.1 years, 34 percent had their maximum growth in the twelfth year, and 96 percent reached their maximum rate between the eleventh and the fourteenth years of age, inclusive.

For boys, 14.5 years was the mean age of maximum rate, the fifteenth year was the year of maximum growth for 43 percent, and 88 percent attained their maximum rate in the fourteenth, fifteenth, or sixteenth years.

The investigator noted (368:309-10):

Since the dates of measurement were irregularly distributed, ranging between about six months and a year and a half, it was necessary to interpolate for full year intervals. This was done so that the stature used corresponded to the full completed year. It will be understood that the measurements as taken are not sufficiently accurate for our purpose and that with greater accuracy and consideration of seasonal variations in growth the results would be slightly altered.

A preliminary study on the prediction of stature during the age interval from six years to maturity was reported by Meredith (415). Fifty individual stature curves for Iowa City white males were employed. The curves were drawn to semiannual measurement values covering the age period six to eighteen years. Bissett and Laslett (366) presented means and standard deviations for stature and weight at six-month intervals over the age period from thirteen to twenty-one years. Their basic data were 4,700 nude observations for each measurement made on 1,850 males in attendance at the Oakland Technical High School during the years 1925-30. Boas (368) published annual stature means for Hebrew boys and girls covering the age period four and one-half to fourteen and one-half years, inclusive. The data were collected between 1892 and 1924 from measurement of 2,453 girls and 2,547 boys at the time of their admittance to two institutions. Grandprey (399) compiled tables of variability for children between birth and six years of age which gave the 10th and 90th percentiles for each sex in weight for age, stature for age, and weight for stature. The data used were "those published in 'Statures and Weight of Children under Six Years of Age' by Robert M. Woodbury."

Diehl (384, 385) made an analysis of stature and body weight data

taken on American college men and women during the years 1928-30. Height was determined without shoes and weight without clothing. The data were accumulated from a variety of institutions. Means at annual intervals from sixteen to twenty-one years, specific for measurement and sex, showed: (a) college men attain their maximum stature at nineteen years of age but continue to increase in weight until twenty-one years; (b) college women do not grow either in stature or weight between the ages of sixteen and twenty-one years; and (c) at twenty-one years of age, college men exceed college women by five inches in stature and twenty-four pounds in weight.

Studies on head and face—Head length and head breadth means for Old Virginians of each sex were reported by Bean (363). His subjects included twenty-two girls and twenty-four boys at age eight and one-half years, forty-three girls and thirty boys at age thirteen years, and sixty of each sex at age eighteen years. Major findings were: (a) the Old Virginian boys exceeded the girls in both dimensions at all ages studied; (b) in relation to status at eighteen years, girls were more precocious at thirteen years than were boys; (c) head length increased .4 cm. for boys and .5 cm. for girls from eight and one-half to thirteen, and 1.1 cm. for boys and .4 cm. for girls from thirteen to eighteen. With reference to this last finding Bean commented: "The extremely greater growth in the boys than in the girls from 13 to 18 may be partly because of the greater growth of the accessory sinuses of the nose in the boys at that time" (363:264).

Hellman (403) studied mean growth in total face height, bizygomatic width, and gonionmenton depth between the fifth year of age and maturity. The data consisted of measurements made from two to seven times at yearly intervals on 670 females and 526 males. He found that (a) throughout the entire growth period studied the "transverse diameter of the face is greatest, the vertical is next in size, and the anteroposterior is smallest;" (b) the male face is larger than the female face in all three dimensions; and (c) the percent increment during the period covered was least for the largest dimension and greatest for the smallest dimension.

The mean length and breadth of the fleshy palate in the newborn were investigated by Ashley-Montagu (356). Length was measured from the incisivum to a chord between both postgingivae and maximum breadth was usually found to correspond to the greatest diameter between points slightly posterior of the molon point. The subjects were ninety white, living males born at Bellevue Hospital. Mean maximum length was 25.6 mm. Maximum breadth exceeded length by 5.0 mm. Goldstein and Stanton (398) studied seven dimensions of the alveolar arches over the age period from two to nine years. Their basic data were four width and three length measurements of each arch, derived from 522 sets of dentures for 300 children of North European stock. Means for each measurement, specific for sex, dental arch, and age, showed: (a) every width studied increased in magnitude between two and nine years; (b) the four maxillary widths were larger for males than females at every age (sex differences for the

mandibular arch were in the same direction but less consistent); (c) female growth showed a greater average absolute gain per year than male growth for all widths and both arches; and (d) neither deciduous arch showed any increase in total length within the age limits considered.

One or more dimensions of the head or face were incorporated and analyzed in the general studies of Bakwin and Bakwin (359), Bayley and Davis (362), Stuart (440), Mohr and Bartelme (418), and Meredith (415).

Studies on trunk—Dunham and D'Amico (387) obtained and analyzed roentgenograms of the thoraxes of twenty-eight infants. The infants were born in New Haven Hospital and varied in birth weight between 2,705 and 4,106 grams. The roentgenograms included a series taken within twenty-four hours after birth and a series taken on the tenth day. All exposures were made in the prone position with arms and legs held in extension. Statistical reduction for diameter of the thorax at the first and eighth ribs yielded two findings: (a) a slight mean increase from the first hour to the tenth day, from 5.5 to 5.6 cm. at first rib and from 10.6 to 10.8 cm. at eighth rib; and (b) a lesser range in diameter at the first rib than at the eighth rib. The experimenters concluded: "The infant's chest does not appreciably change in size during the first ten days of life."

A study of growth of the cardiac silhouette and thoraco-abdominal cavity during the first year of post-natal life was reported by Bakwin and others (358). They took ten dimensions on 311 anteroposterior roentgenograms of the thorax and abdomen made with the infants supported in a sitting posture. A table gave smoothed means, sexes undifferentiated, for each dimension at monthly intervals. General findings were: "During the first year the heart grows rapidly, the frontal plane more than doubling in area. . . . The frontal plane of the thorax more than doubles in area during the first year of life, while the abdominal area increases only about 70 per cent" (358:866).

Davenport (379) presented individual and central tendency growth curves for biacromial width and bicristal diameter covering the age period from six to eighteen years. The central tendency curves for biacromial width (smoothed curves) showed the boys to have broader shoulders than the girls between six and nine years and after fifteen years. The interval between the two decussations (crossings of the curves) was six years. Analogous curves for bicristal diameter showed boys to exceed girls between six and nine years only. Individual curves were classified into two main types, the linear trend type and the concavo-convex type, with numerous intergrades. No indication was given as to the frequency with which each type of curve occurred for each sex. General findings on comparison of these curves with individual stature curves for the same children were: (a) stature spurts tend to precede spurts in pelvic width by about one year; and (b) shoulder width runs parallel to stature, i. e., "a spurt, or retardation, in one is apt to be reflected in the other, though not always simultaneously" (379:156).

Central tendency values and average percent increments for sitting height were reported by Bean (365). The subjects were third generation residents of Virginia and of North European stock. They ranged in age between six and one-half and sixty years. It was found that average sitting height

... is about the same in the Old Virginian boys and girls up to 11, at which time that of the girls becomes greater, to remain so until about the age of 15. . . . From the age of fifteen onward throughout life the sitting height of the male is greater than that of the female. There is a sex difference in the adult of about 5 cm. (365: 450-51).

The percent rate findings are not reviewed since the number of cases in each age-sex group between six and one-half and sixteen and one-half years varied from thirty-five to as few as thirteen.

Studies on extremities—Bean (365) found that leg length was greater in girls than in boys between the ages of seven and twelve years but that thereafter the relationship was reversed to the extent that the average adult leg was 7 cm. longer in the male than in the female. He used a small sampling of Virginian children of North European stock. Davenport (379) analyzed individual curves for thigh length and lower leg length, extending over the age period from six years to maturity, and found that:

The thigh, which is the longer, grows slowly in the juvenile period, increasing only 5 mm. in some cases, 20 mm. in others, in the course of single years. But at some time before puberty—it may be at 11 or 12 or 13 or 14 years—the thigh begins to grow more rapidly, 25 to 30 mm. per year. On the other hand, the lower leg grows in some cases fairly uniformly throughout the juvenile period at about 15 mm. per year, or it may grow 25 mm. or more during these juvenile years when the thigh is growing slowly. Its growth is thereafter damped off, at about 15 years, at the time when the thigh is growing fastest. The consequence is that the two curves of absolute growth of these respective segments of the leg tend to approach each other from childhood to the late juvenile period and thereafter to diverge (379:339-40).

Thigh length was measured as the distance from the articular surface of the inner condyle of the distal end of the femur to the mid-point between the symphysis and the iliospinale; lower leg length as the distance from tibiale to sphyrion.

Means, standard deviations, and coefficients of variation for twelve external dimensions of the upper and lower extremities of newborn white males and females were reported by Bakwin and Bakwin (359). The same investigators (358) obtained means and standard deviations for six roentgenographic measurements of the ulna and radius. In this study the sexes were pooled and the constants derived from eight age distributions of each measurement covering the period from birth to one year.

Davenport (380) studied the growth of the foot in length and breadth between five and sixteen years of age. The subjects were approximately 100 boys and 50 girls in the Brooklyn Orphan Asylum. Measurements were obtained at annual intervals or oftener and were taken in part on the contour form and in part directly on the foot. Foot length was taken

was indicated. The trends for mean index in relation to stature and weight paralleled those on age, showing a decreasing index with increasing stature and weight. Again sex differences were not marked though, in general, boys tended to have the flatter thorax after a weight of 125 pounds, and girls the flatter thorax (lower index) above a stature of 65 inches. Age changes in mean thoracic index between six and eighteen years were also studied by Davenport (382). His method of study differed from that of Weisman in two respects: (a) the basic thoracic dimensions were taken with straight-armed calipers whereas Weisman used curved calipers; and (b) the thoracic index was computed as breadth divided by depth, i.e., as the converse of the ratio obtained by Weisman. The general finding was that the index rose until around the twelfth year and beyond this age first decreased slightly and then showed a slight increase. The index rose to eleven years for girls and twelve years for boys—reaching 135 in both sexes. Davenport (382:21) concluded that "in girls the maximum eccentricity of chest cross-section is achieved a year or two earlier than in boys; corresponding to the earlier adolescence of girls."

Freeman (397) and Davenport (379) investigated the relationship between upper trunk and hip widths. Freeman found that thoracic width was relatively broader than hip width at birth, became increasingly broader during the first eighteen months, and from eighteen months to the age of puberty became progressively narrower. The two measures became equal (gave an index of 100) between three and one-half and four and one-half years. The major finding of Davenport was that bicristal width increases in relation to biacromial width from about 70 percent at six years to 75 percent at fourteen years. Curves for boys participating in manual labor were considered to indicate that manual labor expands the shoulders and results in reduction of the trunk width index.

Extremities—Changes with age in intermembral index, crural index, brachial index, foot index, and leg-foot index were reported by Davenport (378, 380, 381). General findings were:

1. Arm length in relation to leg length, for males, undergoes rapid reduction from 125 percent at the third month of gestation to about 92 percent at birth. More gradual decrease in intermembral index continues to 84 percent at about fourteen years of age, and thereafter there is a slight increase in index to around 86 percent at twenty years.
2. The crural index, or ratio of lower leg length to thigh length, "tends to increase from 6 years to the late juvenile period (11 or 12 years) and then to diminish." Leg length grows relatively more rapidly during the childhood years and thigh length during adolescence.
3. Between the third month of gestation and birth the relative length of the lower arm to that of the upper arm rises from 74 percent to 90 percent. The postnatal trend consists of a decrease to approximately 78 percent at twelve or thirteen years, and a slight rise of about 80 percent at fifteen years. In interpretation of the "peculiar discontinuity" in the crural index trend Davenport wrote: "... The prenatal part follows the general Primate trend, preparing the child, as it were, for an arboreal, brachiating, life; but from birth on the brachial index deviates more and more from the brachiating plan and acquires that of adult man" (381:363).

Changes in Body Proportions

as "the greatest distance from the back of the heel outline to the tip of the second toe" and foot breadth as "the distance of the processus styloideus metatarsi V from the tuberositas ossis navicularis." Means for each dimension, calculated at yearly age intervals, showed that in foot length boys increase from 16.5 cm. at five years to 25.7 cm. at sixteen years and in posterior foot breadth from 6.8 cm. at five years to 9.2 cm. at sixteen years. Corresponding means for girls were 16.1, 23.0, 6.0, and 8.9 cm., respectively. Analysis of individual curves for foot length and stature led to the conclusion: "The spurt in increasing foot growth may occur before or at the age of adolescent spurt in stature" (380:176).

Head and face—Bean (363) found the mean cephalic index to decrease between eight and one-half and eighteen years and to increase slightly to thirteen years in the girls than in the boys, and more between eight and thirteen years in the boys than in the girls. He considered the earlier reduction in the girls' index to show them more precocious than the boys. The adult indexes obtained were 78.1 for males and 79.3 for females, showing females to be shorter headed than males.

In a study covering the age period from five years to adulthood, Hellman (403:1143-44) found: (a) "during differentiation the face changes in proportion, becoming longer and deeper in comparison with its width; the female face becoming relatively longer and the male face relatively deeper;" and (b) "the relative dimensions of the upper and lower face making up the difference; but the ratio of upper to lower face height the same throughout the course of development."

Ashley-Montagu (356) found the average palatal index for ninety new-born Caucasian males to be 119.9. The distribution of palatal types was 9 percent Dolichouranic, 44 percent Mesouranic, 45 percent Brachyuranic, and 2 percent Hyperbrachyuranic. Goldstein and Stanton (398) studied the relation of total length to total width of the deciduous dental arches and found a decrease between two and nine years, i.e., the arches, especially the mandibular, became relatively broader.

Trunk—Weisman (449) studied changes in thoracic index with increasing age, stature, and weight. His subjects were 18,000 Minneapolis school children (roughly 9,000 of each sex) ranging in age from five to eighteen years. The thoracic measurements were made at the nipple level with the children stripped to the waist. Data on each sex were treated separately throughout. For studying changes in mean thoracic index (ratio of thoracic depth to thoracic width) with age, one-year distributions were used. A gradual decrease in index was found, falling from 71 or 72 percent at five years to 68 percent at seventeen years. No consistent sex difference

4. "... The foot index of males tends to diminish slightly with age, (between 6 and 16 years) from 38.5 to 35 percent. . . . The female index shows no such trend, fluctuating between 37 and 39" (380:197-98).

5. Foot length divided by tibial length gives a progressively reduced ratio of from 80 to 67 percent during the years four to sixteen. This decline in leg-foot index with age is "due to exceptionally rapid growth of the lower leg during childhood" (380:183).

Miscellaneous—Bakwin and Bakwin (359) studied newborn infants of both sexes and found the proportion of a series of five dimensions to total body length identical for each sex. The dimensions were thoracic circumference, weight, biacromial diameter, biacromial diameter, and bi-iliac diameter. The relation of stem length to stature, thoracic circumference to stature, and thoracic circumference to stem length was studied by Bayley and Davis (362). Birth to three years was the age period covered. It was found: "The ratio of stem length to total length, after a slow decrease through the ninth month, falls off very rapidly. . . . The same is true of the ratios of chest circumference to length, and of chest circumference to stem length" (362:54). The same investigators, after computing the ratios weight to stature, weight to square of stature, and weight to cube of stature, concluded: "All of the weight-length indices show that, for the most part, the boys are heavier relative to their length" (362:59). Bean (365) found girls and boys to have a mean sitting height index of approximately 55.2 at seven and one-half years and 52.5 at twelve years. At fifteen and one-half years the girls' index was 52.8 and the boys' index, 51.8. This decrease for the boys and increase for the girls, from twelve to fifteen and one-half, was considered to show that "the sitting height in the girls begins to grow more rapidly than the stature at an earlier age than in the boys." In the adult, the female index obtained was 53.5 and the male index, 52.5. Findings for leg length as a percent of sitting height were also reported by Bean.

Davenport (379, 380) drew the following generalizations from his study on Nordic children at the Brooklyn Orphan Asylum:

1. On the average, biacromial width is about 23 percent of stature at six years, and 21.7 percent at sixteen years. The ratio for girls exceeds that for boys between ten and one-half and sixteen years.

2. Bicristal width in relation to stature, on the average, is 16.1 percent at six years for both sexes. At sixteen years the boys' index is 15.7 percent and the girls' index, 16.5 percent.

3. "The bi-acromial width is roughly two-thirds of the sitting supersternale height; i.e., the height of the trunk is about $1\frac{1}{2}$ times the breadth of the shoulders." The ratio for females is slightly less than this approximation since "the upper part of the female trunk is always relatively slenderer than that of the male" (379:160-62).

4. On the average, the inter-cristal diameter is roughly one-half the sitting-supersternal or torso height. The index for females is lower than that for males during the age period six to sixteen years.

5. For both boys and girls, foot length at six years of age is about 15.5 percent of stature. At sixteen years the ratio is 14.5 for girls and 15.3 for boys.

Factors Conditioning Growth

Race—Mean birth weights for 3,255 normal non-syphilitic negro infants and for 1,801 white infants were calculated by Bivings (367). Both groups of infants were born in Grady Hospital, Atlanta, Georgia, and were considered to represent the same economic level. The negro infants were found to have a mean birth weight of 6 pounds, 14 ounces, or ten ounces less than the white infants. Bakwin and Bakwin (359) studied twenty-four external dimensions of the newborn in relation to racial stock of parents. Mean and probable error of mean were obtained for each dimension by four racial groupings—North European, 234 cases; Central European, 103 cases; Mediterranean, 194 cases; and Jewish, 73 cases. No significant differences were found.

An investigation of differences in mean thoracic index according to nationality was made by Weisman (449). The subjects were Minneapolis school children ranging in age between five and fourteen years. Four nationality groups were employed. These were Scandinavian (over 1,300 of each sex), German (around 500 of each sex), Russian and Polish (approximately 500 of each sex), and Jewish (more than 300 of each sex). The mean thoracic indexes, specific for nationality, sex, and one-year age groups, showed no appreciable difference between the various nationalities.

Manuel (413) analyzed data for stature, weight, bideltoid and bitrochanteric diameter, anteroposterior diameter of thorax, and two measures of arm girth taken on approximately 1,800 Mexican children of each sex ranging between the ages of six and sixteen years. The data were obtained in the elementary schools of Laredo and El Paso, Texas, during the spring of 1930. Central tendency values for annual age-sex groups were calculated. The series for stature and for weight were compared with Baldwin-Wood averages and it was found that the Mexican children were both shorter and lighter. The average differences over the age period studied were approximately 7 pounds in weight for each sex and, in stature, 2.0 inches for boys and 1.8 inches for girls.

Family—A study of the resemblance of non-twin siblings in stature and weight during the age period from seven to twelve years was made by Palmer (419). Data for 193 pairs of brothers and 154 pairs of sisters were assembled with reference to a point where the two brothers (or two sisters) had reached a certain chronological age. Pearsonian product moment coefficients, specific for measurement, sex, and annual age groupings, gave the following findings:

1. The average coefficient of correlation, all ages seven to twelve, for both brothers and sisters together is .44 for height and .33 for weight.
2. The average of the coefficients, all ages, for both height and weight together is .47 for brothers and .30 for sisters.
3. The degree of correlation tends to decrease with age during the growth period studied. The decrease is considerably less for brothers than for sisters.

Boas (369) reported an investigation on the tempo of growth of fraternities. His data were stature observations on boys and girls from six to seventeen years of age made at the Hebrew Orphan Asylum, New York. The children of each sex were classified into a tall, a medium, and a short group, classification being made at seven, nine, eleven, and thirteen years. Mean absolute increments were computed for each group at each age. The general finding was (369:415):

... The brothers and sisters of the tall ones, who included many of those with rapid tempo of development, also have rapid tempo, an early time for the maximum rate of growth, a rapid rate and an early termination of growth, while the brother and sisters of the short ones, who include many of those with sluggish tempo of development, have a slow rate of growth of less intensity and longer duration.

No tables or specific figures were given, nor was the number of cases reported.

Physical measurement data for Harvard college men and the women of four eastern women's colleges were analyzed by Bowles (370). The major results were:

1. Means for each of thirty dimensions, based on measurement of 481 fathers and their sons, showed the sons to be larger than the fathers in all dimensions but breadth of head, breadth of hips, and shoulder-elbow length. For a larger series of 1,160 fathers and their sons, the fathers were 3.4 cm. shorter and 3.7 kilograms lighter than the sons.

2. Means for each of twelve dimensions, obtained from measurement observations for 413 mothers and their daughters, showed an increase of the daughters over the mothers in all dimensions except breadth of hips. The daughters exceeded the mothers by 2.9 cm. in stature and 1.8 kilograms in weight.

3. Data on thirty dimensions for seventy-nine couples of younger and older brothers showed the younger to excel the older, on the average, in every measurement except breadth of head and breadth of waist.

4. Mean stature and weight comparisons for 140 pairs of sisters by juniority and seniority of birth showed that the younger exceeded the older by .5 cm. in stature and 0.45 kilograms in weight.

The various samples were considered comparable for age, racial extraction, geographic location, and socio-cultural status.

Geographic area—Bivings (367) secured birth weight data on white infants from Iowa City, New Haven, Los Angeles, and Atlanta. Each locality was represented by 1,000 or more cases. He (367:726) found that "with the notable exception of Los Angeles, the weight rises considerably as we approach the southern portion of the United States." This trend was thought probably due to the quantity of ultraviolet reaching the earth. The significance of Bivings' finding is dubious, since (a) the sexes were neither differentiated nor shown to be represented in equal proportions in all samplings; (b) no evidence was given to show that the time and conditions of weighing were comparable for all localities; (c) the racial and socio-economic composition of the samples was not discussed; and (d) the mean difference in birth weight between the most northern and the most southern area was three ounces.

Palmer and Collins (429) analyzed data for seven physical measurements taken on approximately 30,000 children of native white parents and grandparents in four geographic sections of the United States. The children were between six and fifteen years of age and, except for a relatively small number in the western section, were all from large urban centers. Analysis was made in terms of annual means and annual mean increments for each geographic section, the data on each sex being treated separately. The authors (429:345) summarized their findings as follows:

1. On the whole, children from the northeastern section tend to be the largest, those from the north central area the next largest, children from the south central area are third largest, and those from the western section are the smallest.

2. Study of growth increments, calculated as the differences between averages of successive age classes, shows no consistent differences in mean increments for children in the various sections.

It should be noted particularly that the first finding is a gross generalization. Thus the difference between stature means for the different areas were found to fluctuate irregularly rather than to show any sectional consistency. Weight means, on the other hand, showed decided sectional differences and the weight-height index indicated that the stockiest children were in the northeast region and the least stocky in the western area.

Suski (442) compared obtained means for stature, thoracic circumference, and weight of American-born Japanese school children with analogous means for Japan-born Japanese children. The experimental group consisted of 573 girls and 498 boys ranging in age between six and one-half and seventeen and one-half years. They were measured at private schools in Los Angeles being conducted to supplement the public school education. The parents were stated to be full-blooded Japanese representing all walks of life. In round numbers, American-born Japanese were found to excel Japan-born Japanese by 7 percent in stature and thoracic circumference and by 20 percent in weight. Suski (442:349) concluded:

The children in this investigation are certainly growing faster, that is, taller and heavier, age for age, in comparison with children in Japan. It seems very likely that they will grow up to be taller and heavier adults than native born Japanese, inferring from the height and weight attained by these children at 16 or 17 years of age, which were already greater than those of adult Japanese.

The greater size of American-born Japanese was interpreted as being due to influence of geographic location.

A study of stature and weight of isolated mountain children (roughly 700 of each sex) of the Southern Appalachians was made by Wheeler (452). The subjects ranged in age from six through seventeen years, represented the agriculture and lumbering classes, and were largely of North European stock. Analysis consisted of (a) statistical description of the southern mountaineer children in terms of central tendency and variability of annual age-sex distributions; and (b) comparison of central tendency values with corresponding values for seven other samplings

of American children. The general finding was that East Tennessee mountain children do not differ significantly in mean stature and weight from unselected children in various other parts of the country.

Season—The influence of season of birth on the external dimensions of the newborn was studied by Bivings (367) and by Bakwin and Bakwin (360). Neither study differentiated the data according to sex: both studies classified the data in terms of quarter year in which birth occurred. Bivings treated birth weight data accumulated from Iowa City, New Haven, Los Angeles, and Atlanta. He found a tendency for birth weight means to follow the curve of sunshine, i.e., to be low in winter, higher in spring and summer, and lower again in the fall. The obtained means were approximately 7 pounds, 4 ounces for winter, 7 pounds, 7 ounces for spring and summer, and 7 pounds, 6 ounces for fall. The data analyzed by Bakwin and Bakwin covered twenty-four dimensions taken on newborn infants at two New York hospitals. They reported their findings as below:

The following dimensions showed seasonal changes, the diameters being smaller during the spring and summer and larger during the autumn and winter: bimalar diameter of the face, height of the upper part of the face, height of the lower jaw, nasal height and breadth, biacromial diameter, bi-iliac diameter, circumference of the thorax and dimensions of the hand (360:1236).

In contrast with Bivings' findings, birth weight means were higher in summer and winter than in fall and spring.

Palmer (426) made a study of fluctuations in the mean monthly weight increment occurring coincident with changes of season. His basic data consisted of approximately 80,000 weight values obtained on some 2,500 native born, white elementary-school children at Hagerstown, Maryland. Each child included had protocols which were 80 percent complete (weighings at monthly intervals between September and May of each school year) for a four-year period. The age range covered by the study was six to sixteen years. The major findings were:

1. At every age from six through fourteen years, the absolute monthly increment for weight is at a maximum during the month approximately delimited as September 15 to October 15, and at a minimum during the month April 15 to May 15.
2. The October rate is roughly one pound per child per month greater than is the May rate at all ages considered.
3. Both sexes show the same seasonal trend during the elementary-school years: maximum in October, marked decrease in November, horizontal or slightly downward trend during January to March, decided decrease again during April and May, and a definite rise during the summer.

Year or decade—An investigation on "the variation in successive calendar years of growth in body weight of children between six and fifteen years of age" was reported by Palmer (430). The data were serial weight observations for four years or more on approximately 2,500 children. They were obtained at Hagerstown between May, 1922, and May, 1928. The procedure in analysis was to calculate absolute annual increment means: (a) specific for age, sex, and year of measurement; and

(b) specific for age and sex but unspecified with regard to year of measurement. The mean gains in (a) were next expressed as percents of, and (b) the resulting series for percents for each sex and year of measurement averaged. It was found that 1924-25 was an inferior "growing" year and 1926-27 a good "growing" year. These two most divergent years of the six-year period studied showed that "in as short an interval as three successive calendar years, annual growth in weight may vary as much as 15 percent," from 91 percent of the average for the entire period to 106 percent in this average. Palmer (430-1004) considered this study to "break ground" for more refined studies relating secular trends to such factors as "total hours of sunshine, hours of cloudiness, amount of rainfall . . . amount of unemployment, per capita wages of the employed . . . incidence of epidemic diseases, fluctuations of endemic diseases . . . and similar variables."

Bowles (370) analyzed stature and weight data for approximately 3,000 Harvard men and 1,200 women of four eastern women's colleges according to decade of birth. His material covered the decades 1856-65 to 1906-15. He found:

1. For stature, a mean increase of .10 cm. per annum for college men and .08 cm. per annum for college women. Using 3 times the probable error as a criterion, a statistically significant difference occurred every 6.75 years for men and every 15.3 years for women.

2. For weight, an annual mean increase of .21 pounds for college men and .10 pounds for college women, with a statistically significant difference every 8.5 years for men and every 34.1 years for women.

The influence of date of birth on growth in stature was studied by Boas (368). The subjects were 5,000 Hebrew children (roughly 2,500 of each sex) measured at the time of their admittance to the Hebrew Orphan Asylum and the Hebrew Shelter and Guardian Society. For analysis, the stature observations were divided according to sex, grouped in one-year age intervals between four and fourteen years, and subdivided for quinquennial periods of birth from 1892-94 to 1920-24. Comparison of the obtained means for each quinquennial subgroup with means for each age regardless of quinquennial period of birth showed a "very considerable" mean increase in stature according to date of birth.

Socio-economic status—Bakwin and Bakwin (359) compared newborn males representing different socio-economic environments in regard to means for body length, weight, bimalar diameter, biacromial diameter, bi-iliac diameter, and thoracic circumference. The cases were 114 first- and ninety-one later-born males from Fifth Avenue Hospital (representing "homes of moderate income") and 205 first- and 265 later-born males from Bellevue Hospital (representing "very poor homes"). They (359: 617) found:

Infants born in the Fifth Avenue Hospital are regularly larger in all dimensions studied than are the Bellevue Hospital newborns. The differences are greater for first- than for later-born infants. In most instances the differences are statistically reliable.

A study of the median differences in thoracic index, stature, and weight between "children reared in poor and those reared in favorable social environments" was reported by Weisman (449). The subjects were approximately 4,000 Minneapolis school children ranging in age from five to fourteen years. There were 1,000 each of boys and girls from four representative schools in the best sections of the city and 1,000 each of boys and girls from four schools in the poorest sections. Boys and girls from the better districts were found, on the average, to be taller, much heavier, and to have a definitely flatter type of chest than boys and girls from the poorer districts.

Mitchell (417) studied the growth of white Puerto Rican school children with reference to socio-economic status. His subjects were 100 eight-year-old children of each sex and 900 ten-year-old children of each sex, all of Spanish origin and born in Puerto Rico. Socio-economic classification was made in terms of amount of house rent, number of rooms in the house, and average number of persons per room. The more privileged groups were found to be taller and to have greater hip width, larger arm girth, and greater amounts of subcutaneous tissue over the biceps than poorer groups.

Stature and weight data were collected from various types of college institutions by Diehl (384, 385). Means at successive annual intervals were calculated for men at each of ten institutions and for women at each of eight colleges. Findings were:

In height, the [male] students of the private colleges, Princeton, Yale, and Stanford, exceed those of the state universities and the students of the state universities in turn are taller than the students of the municipal universities studied. In weight, a similar general grouping of institutions is found, although a certain amount of shifting of the positions of individual colleges and universities occurs (384:477).

... The heights and weights of the women from the various colleges show that the students of the two private colleges, Smith and Stanford, are both taller and heavier than the women of any of the other institutions from which data were obtained (385:628).

Diehl considered socio-economic selection to be the major factor accounting for these institutional differences.

Economic depression—Mean birth weights for approximately 1,000 negro infants born in Grady Hospital, Atlanta, during each of the years 1930, 1931, and 1932 were obtained by Bivings (367). The means showed a steady decline, from 7 pounds through 6 pounds and 14 ounces, to 6 pounds and 12 ounces. Bivings (367:728) concluded that "the falling birth weight undoubtedly is greatly influenced by nutritional deficiencies in the mother as a direct result of the depression."

Palmer (421, 422) contributed two papers treating the problem of whether or not the body weight of elementary-school children of Hagerstown, Maryland, differed in 1933 and 1934 in significant particulars from the body weight of children of the same sex and age and living in the same city during the economically more prosperous years of 1921-27.

Hagerstown was considered typical of the smaller urban communities of the United States in regard to the severity of its economic disturbance during the depression years. The data on each sex were analyzed separately. Means at annual age intervals were obtained for 1921-27, 1933, and 1934. Mean absolute annual gains were calculated for 1921-27, for 1933-34, and for each of the separate years from 1921 to 1927. Major findings were:

1. Corresponding weight means for children in 1933 and 1934 show no consistent or statistically significant differences from means of weight for the period 1921 through 1927.

2. At each age and for each sex the mean annual increment is lower for the year 1933-34 than is the mean for the period 1921-27 taken together. However, the mean gains for 1933-34 are not significantly lower than those for 1924-25.

With reference to the increment findings, Palmer (421:1462-63) wrote:

It becomes necessary to conclude, then, that the school year 1933-1934 was as good a "growing year," despite the depression, as at least one other year when the general economic status of the population was presumably much higher. On the other hand, since many of the factors which may be effective in making some years good and others poor "growing years" are not known, it is impossible to state conclusively that the depression has not affected adversely the growth in weight of children.

An investigation of stature and weight during the depression years 1929-33 in school children ages six to fourteen years was made by Palmer (423). The children were drawn from approximately 5,000 more or less typical working-class families of six large cities. They were grouped into three classes on the basis of family income throughout the four-year period: those whose families remained relatively comfortable, those whose families remained relatively poor, and those whose families changed from a relatively comfortable to a poor economic status. Forty-five percent of the subjects fell in this third class, which Palmer designated the "depression poor." For the age period from six through nine years it was found that the average weight of children from the continuously comfortable families was 4 to 5 percent greater than the average weight of all children taken together; that the relative weight of children from the poor families was 1 to 2 percent below the weight of all children; and that the relative weight of children from "depression poor" families descended from about 2 percent above the general average in 1928-29 to 1 percent below the general average in 1932-33. The conclusion was drawn that so far as the wage-earning class in large urban centers is concerned, "it is children from families whose income has fallen to a low level who have been affected by the depression" (423:1112). The specificity of this conclusion should not be overlooked: no downward trend for the "depression poor" was found for weight of children ten years and above or for stature of children at any of the ages studied.

Diet and disease—Two studies on the influence of undernutrition and mild infection upon growth during the first year of life were reported by Bakwin and others (358). Their experimental group consisted of

230 infants admitted to the wards of a New York hospital "as healthy boarders or because of mild infections of the upper respiratory tract. . . . They were retarded in growth in weight and total body length. . . ." (358:870). The control group was somewhat larger and was considered normally healthy and well nourished. Roentgenograms of the forearm and thoraco-abdominal cavity were obtained and central tendency values for sixteen roentgenologic dimensions calculated at eight age subdivisions of the first year. Findings were (358:872-83):

1. The cardiac silhouette of the undernourished infant grows more slowly in all its dimensions than that of the better nourished infant. . . .

2. The thoracic dimensions grow more slowly in the undernourished than in the healthy infant. . . .

3. For the same height, the malnourished infant has a smaller heart and thoracic cavity, a narrower mediastinum and a larger abdominal cavity than the well nourished infant. . . .

4. The ulna and radius of undernourished infants grow more slowly in all dimensions than those of normal infants. . . .

5. Ulna and radial length-width indices showed that the bones of the undernourished infants were narrowed in relation to the length of the bones. . . .

Bakwin and Bakwin presented some additional findings on ossification of the carpal centers. To quote (358:881-82):

During the first month of life about 20 per cent of infants showed ossification of one or more carpal centers. . . . after the thirty-first week of life only occasional infants fail to show ossified carpal centers. The rate is slightly accelerated in the girls. . . . No difference was found in the rate of ossification of the carpal centers in the normal and undernourished infants.

This latter finding appears contradictory to Todd's finding (444) that the carpal bones are "most susceptible to disturbance as a result of ill-health or nutritional deficiency."

Mitchell (417) studied the growth of ten-year-old white Puerto Rican school children with reference to urban and rural living conditions. He found the urban children "to be taller, have greater hip width, larger arm girths and greater amounts of subcutaneous tissue over the biceps than rural children." In view of the fact that hookworm and diet deficiencies were known to be more prevalent among the rural children, Mitchell interpreted his findings as primarily due to differences in dietary and disease conditions.

Hoefer and Hardy (405) took stature measurements on a representative sampling of Joliet public school children between the ages of eight and thirteen and found that in terms of the Baldwin-Wood norms shortness was more than five times as frequent as tallness. A concomitant finding was that the soil in which most of the vegetable supply for the town was grown showed deficiency in mineral content, particularly phosphorus. While definite statement as to the relationship between soil deficiency and growth retardation must await more intensive research, this study showed that the problem merits thorough investigation. It is clear

that "the value to the growing child of an 'adequate diet' loses its significance if the recommended food items are lacking in nutritive content."

Health programs—A study of the influence of improved care on growth in external dimensions and proportions during the first year of life was made by Bakwin, Bakwin, and Milgram (358). Their experimental group was obtained at a health clinic where, at monthly intervals or more frequently

advice was given regarding general care, with particular emphasis on diet. In some instances families were aided with milk . . . Cod liver oil was distributed freely . . . (358:1031).

The infants of both the experimental and the unsupervised group were born in Bellevue Hospital and represented the same poverty-stricken district. Means for the age period, birth to three weeks, gave weight advantages to the supervised group of 370 gm. for males and 340 gm. for females. At forty to forty-seven weeks the means for the experimental group exceeded those from the unsupervised group by 1,500 gm. and 950 gm., respectively. Ratios of each of five dimensions—thoracic circumference and bimalar, bigonial, biacromial, and bicristal diameters—to body length showed that during the first month of life the body proportions of the two groups were similar but after the eighth week the experimental group had relatively larger lateral dimensions than had the unsupervised group. There were subtle factors operating in the selection of the two samples which may have exaggerated the improvements found to accrue from more adequate care.

Hoefler and Hardy (406:368) summarized the major findings from "an experimental investigation in which a representative group of third-grade pupils who participated in a carefully planned three-year course of health instruction was compared with a similar group of pupils who had only the regular course in physiology and hygiene provided by the school curriculum." They (406:371-81) wrote:

1. In no instance were the variations large but, when two groups from the same socio-economic level who were alike as to age and size were compared at the close of the teaching projects, pupils who had participated in the health-instruction classes were consistently superior to the others. They were taller, weighed more, and were broader of shoulders than were the control pupils.

2. Test results on grip, muscle contraction of the upper arm, and vital capacity, all pointed to more marked improvement of the pupils in the health-education classes as compared with the control pupils of like ages and initial status.

Concomitant improvement for the experimental group as compared with the control group was found in dietary practices (consumption of leafy vegetables, milk, cereals, fruit), in number of children reporting sufficient sleep, in amount of dental attention, and in correction of posture defects.

Boas (368) investigated the influence of residence at the Hebrew Orphan Asylum, New York, upon growth in stature. The procedure was that of comparing children entering the institution with those of like age and sex who had been in residence for various periods of time. Comparisons

were made for the period prior to 1918 and for the period 1918 to 1928. Children in residence during the later period showed positive differences as against negative differences for those in residence during the earlier period. In explanation of the improved stature growth during the later period, Boas noted that in 1918 the administrative policy of the institution was changed and thereafter there was less regimentation, more adequate diet, increased recreational facilities and rest hours, camping experience for one month each year, improved medical and dental care, and an increased effort to meet the needs of individual children.

Prematurity—Mohr and Bartelme (418) studied the physical growth of prematurely born white children during the age period from approximately one to seven years. The data were obtained from 477 examinations of 250 premature children and 173 examinations of 152 of their siblings. The range in birth weight for the prematures was from 900 to 2,500 grams. The entire premature group had received early post-natal care at the Premature Infant Station, Sarah Morris Hospital of Michael Reese Hospital, Chicago, and was measured through the social service department of the Station as part of a routine follow-up service. Major findings were:

1. The sibling boys excel prematurely born boys in stature until three years of age. Prematurely born girls attain sibling norms at two years. Beyond these ages no reliable differences are found.
2. The prematurely born boys consistently weigh less than the full-term sibling boys until the age of four years. After this the mean curves for the two groups closely approximate each other.
3. The prematurely born boys and girls do not differ reliably from the sibling boys and girls in head circumference.
4. Prematurely born boys and girls weighing 2,000 grams or more at birth grew more rapidly than those weighing 1,500 grams or less. Mean curves for the latter group were persistently below those for the former group, over the entire age period studied, in weight, stature, and head circumference.

These findings were obtained using chronological age for the sibling group and corrected chronological age (statutory age minus amount of prematurity) for the prematurely born children.

Ossification and Calcification

Ossification—Roentgenograms for the upper and lower extremities of 500 newborn infants were examined by Menees and Holly (414). They reported frequency of appearance of ossification centers in the shoulder, elbow, wrist and hand, hip, knee, ankle, and foot regions. Forty-seven percent of the females and 46 percent of the males showed a center for the head of the humerus, as against less than 1 percent for each sex showing a center for the head of the femur. The elbow showed no epiphyses: the lower epiphysis of the femur was present for 99 percent of the females and 98 percent of the males. Thirteen percent of the females and 4 percent

of the males showed an ossification center for the capitae. Appearance of centers for the cuboid was found for 56 percent of the females and 35 percent of the males. The development of the two sides of the body was symmetrical for 96 percent of the cases and in only one individual did more than one asymmetrical center occur.

Flory (391) analyzed 6,600 roentgenograms of the right hand distributed over the age period from birth to maturity. He used both measurement and inspectional technics. Major consideration was given to the mean magnitude of sex differences in osseous processes from age to age. He (391:211) found that

Girls are ahead of boys at birth; they are about one year ahead at school age; they are approximately one and a half years ahead at age nine; and about two years ahead of boys at the average age of the onset of puberty.

Tentative pictorial standards for ossification of the hand and foot were presented by Stuart (440). These standards showed carpal, tarsal, and epiphyseal development of the least mature, most mature, and those at percentiles 10, 25, 50, 75, and 90 for each quarterly interval of the first year and for semiannual ages covering the second year. Todd (455:264-79) tentatively described norms for appraising skeletal maturation during the age period from five to eighteen years. The descriptions were made for six-month age intervals and were considered to represent development of the mediocre or unselected average. They covered bony differentiation in the knee, elbow, hand, foot, and shoulder. J. W. Pryor (432) reviewed roentgenographic research on the time element in commencing ossification and epiphyseal union and gave case illustrations of how the marked acceleration of the female may be applied to the determination of sex.

Calcification—Logan and Kronfeld (412) studied the order of onset of calcification of the permanent teeth. Their material included twenty-two jaw specimens for subjects ranging in age between birth and four and one-half years. For both upper and lower jaw, they found onset to begin shortly after birth for the first permanent molars, between three and six months for the permanent central incisors and cuspids, and at about one and one-half years for first bicuspid, two years for second bicuspid, and two and one-half years for second permanent molars. Calcification of the lateral incisors was found to begin at three to six months for the lower jaw and at twelve to fifteen months for the upper jaw. The investigators recognized the paucity of observations upon which their findings were based and stressed time sequences rather than an exact age interpretation of their study.

The order of complete calcification of the permanent teeth was investigated by Kronfeld (408, 409). The first permanent molar was found to be characterized by fully calcified crown and completely matured enamel at two to three years. The incisors reached this stage at about the fifth year, the cuspids at about the sixth, the first bicuspid at six years, and the

second bicuspid at about seven years. With reference to the incisors and cuspids, Kronfeld (409:1535) wrote:

... After the age of 4 or 5 years, it is unlikely that any form of disease, deficiency, or therapeutic measure can influence the enamel of the twelve anterior teeth, since by this time the crowns are fully formed and the enamel matured or nearly so.

Pubescence

Engle and Shelesnyak (389) analyzed first menstruation data for a group of 250 Jewish girls on whom the exact dates of birth and of menarche were known. The data were obtained from the files of the Hebrew Orphan Asylum, New York, and represented menarches occurring between 1926 and 1932. Cases with a history of endocrine dysfunction, thyroid trouble, obesity, and pneumonia were excluded. A twofold treatment of the data was made:

1. Central tendency and variability analysis showed the average age of first menstruation to be 13.5 years and the range in age to be from 11 years to 16.3 years.

2. Tabulation of the 250 menarches according to seasonal distribution of incidence showed that 18 per cent occurred in the summer months of June, July and August, 25 per cent in the autumn months, 30 per cent in the winter, and 27 per cent in the spring.

With reference to the low percent of menarches found to occur during the summer months, the authors (389:433) wrote:

We have satisfied ourselves that the condition is due not to faulty recording of data during the summer months, but is a true expression of a seasonal effect on menarche.

A study of the sexual development of 600 non-Hebrew white boys ranging in age from nine to eighteen years was reported by Kubitschek (410).

Dimock (386) investigated the relation of pubescence to stature and weight during the age period from twelve to sixteen years. The subjects were 200 boys examined annually for three successive years. Pubescent status was determined by the Crampton criteria. Means and mean annual increments, obtained for various subdivisions of the data, revealed the following findings:

1. The pubescent boy at twelve or thirteen is as tall and heavy as the boy two years older who is still prepubescent.

2. "At fourteen the post-pubescent boy exceeds the pre-pubescent of the same chronological age by over four and one half inches in height and almost 23 pounds in weight" (386:179).

3. There is a tendency for decreasing gain in height and weight as the boy becomes older if he remains preadolescent.

4. "The most rapid growth in height and weight comes in the year during which the boy passes from pubescence to post-pubescence. This is true whether actual growth or percent increase measures are used" (386:186).

5. The amount of growth that accompanies the change from pubescence to post-pubescence "is approximately the same for twelve-, thirteen-, and fourteen-year olds. ... These findings are at variance with the conclusions of other investigators to the effect that growth is more rapid and intense when pubescence is attained early" (386:184).

The relation between age of first menstruation and absolute increase in stature was studied by Boas (368). For 352 Horace Mann School girls, he found that the mean age of first menstruation was 13.1 years, that 80 per cent of the dates fell between the age limits of 11.5 years and 14.5 years, and that the total age range was ten to seventeen years. The mean age of first menstruation for seventy-nine Horace Mann School girls observed continuously from ten to sixteen years was found to be 13.3 years. Classification of 483 Horace Mann School girls between nine and sixteen years of age according to year in which maximum absolute growth occurred gave a mean age of 12.1 years. Similar analysis for 222 Horace Mann School girls continuously observed from eight to seventeen years gave 12.0 years as the mean age of maximum absolute stature increment. Boas concluded that the mean age of maximum rate of stature growth preceded the mean date of first menstruation by one year.

Shuttleworth (438) reworked Van Dyke's material on the relation of first menstruation and stature for sixty girls. The material consisted of annual stature data over the period extending from two years prior to two years following first menstruation for twenty girls who matured at twelve or earlier and for nineteen, sixteen, and five girls who matured at thirteen, fourteen, and fifteen years, respectively. Van Dyke had arranged the girls in rank order according to stature two years before puberty, selected the fifteen tallest and fifteen shortest, and calculated the mean age at which menstruation first appeared for these two groups. Shuttleworth arranged the girls in rank order according to stature at a given chronological age, selected the lowest and highest fourth of the age distribution, and calculated the mean age of first menstruation for each group. Van Dyke had obtained means of 12.5 years for the short group and 13.9 years for the tall group. The means obtained by Shuttleworth for girls aged thirteen years were 14.1 years for the short group and 12.2 years for the tall group. This twofold analysis of the same data pointedly illustrates the interrelatedness of methodology and findings. The two sets of findings are contradictory only when one fails to recognize that in one case tallness and shortness are a function of time of first menstruation and in the other case they are a function of chronological age.

A study purposing "to consider certain anthropometric measurements and osseous indices which will predict the age at which a given girl is likely to reach puberty" was reported by Flory (390). The data were obtained from records for eighty girls on file at the University of Chicago Laboratory Schools. These records gave date of first menstruation and, at yearly intervals for a ten-year period, roentgenograms of the right hand and a series of anthropometric measurements. Iliac diameter was found to be the best anthropometric predictor of puberty. This dimension correlated with first menstruation .41 at nine years and .57 at twelve years. Appearance of the sesamoid at the distal end of the first metacarpal correlated .76 with first menstruation. The mean age of appearance of this sesamoid was found to be eleven years, i.e., two years prior to the mean age of

puberty. In no instance did first menstruation occur before the appearance of the sesamoid. Flory (390:5-6) concluded:

Osseous development seems to be more closely related to puberty than is physical size. . . . The time of appearance of the sesamoid on the distal end of the first metacarpal is the simplest and best single indicator of puberty in girls.

Clinical Instruments

Tentative standards for use in clinical appraisalment of infants were presented by Stuart (440). Ranges and five percentiles were given at seven age intervals during the first two years for ossification of hand and foot and for a series of anthropometric measurements. There were separate tables for each sex. Grandprey (399) constructed graphs of variability in weight for stature covering the age period from birth to six years. The graphs, one for each sex, were derived by calculating five percentiles at each of thirty-four stature intervals, plotting the obtained percentile values, and drawing a smooth curve through each of the five percentile series. H. B. Pryor and Stolz (431) published width-weight tables for each sex at yearly ages from six to sixteen years. These tables were an extension of the Baldwin-Wood height-weight tables. They gave seven normal weights for each stature and age depending on the width of the iliac diameter. Height-weight tables for Mexican school children of each sex, age range five and one-half to fifteen and one-half years, were presented by Manuel (413). Diehl (384, 385) constructed age-height-weight norms for college men and college women. Breathing capacity norms for boys and girls of given age, height, and weight were reported by Kelly (407). The age range covered was twelve to eighteen years.

The American Child Health Association (355) published a manual explaining the technic for determining three indexes of nutritional status and giving norms in each index for boys and girls seven to twelve years of age. These indexes assume that the relation of musculature, subcutaneous tissue, and weight to skeletal build offers the best objective approach to the appraisalment of nutritional status. A less complex index for identifying children with small amounts of musculature and fatty tissue relative to body build was developed by Franzen and Palmer (394). This index incorporated measurements of arm girth, chest depth, and hip width and, in consequence, was designated the ACH index. Norms for each sex over the age period seven to twelve years were given.

Mitchell (416) discussed eight selected cases of elementary-school children on whom he had medical examination records and findings from application of the American Child Health Association indexes of nutritional status. The cases were selected to show the value of each of the three objective indexes and to illustrate the reciprocal relationship which should obtain between clinical standards and clinical observations. It was claimed that standards should help to release the clinician from the difficulties of individual judgment, while observations should serve to prevent the abuse of standards.

The relative adequacy of each of four methods of selecting malnourished children was studied by Franzen (395). The four methods were weight for height, weight for height and hip width, rating by a medical examiner, and the ACH screen or index. The criterion in terms of which each method was evaluated was complete application of the American Child Health Association indexes. It was found that if the objective was to select children who were underweight for their skeletal build the height-hip-weight method and the ACH method were about equally successful. If, however, the objective was to identify children with overlapping deficiency in weight, musculature, and subcutaneous tissue for body build, the ACH method was distinctly superior to the other methods. In evaluating this study it is pertinent to note that the ACH index was initially constructed to approximate, in abbreviated form, the results obtained with the criterion indexes.

Stix and Kiser (439) investigated the relation between physicians' estimates of nutrition and two widely used "expected weight" tables. They assumed that the children rated "poor" by the physicians were the truly undernourished children. Thus when it was found that only about 20 percent of the children appraised as "poor" were underweight according to the tables, they concluded that weight tables were not sufficiently accurate for satisfactory diagnosis of nutrition of school children.

Shuttleworth (437:91) proposed that research attention be given the hypothesis that "increments provide a better index of satisfactory development than the conventional height-weight-age-sex tables." Similar emphasis of individual progress was suggested elsewhere (402).

Needed Research

Rigorous research—Direct perusal of the research literature reviewed above leads to the summary evaluation: (a) an extensive list of physical growth problems has been investigated during the last three years; (b) comparatively few of the researches reported have made an explicit and unequivocal contribution to the problems studied; and consequently (c) a large body of inconclusive findings, suggestive leads, and inviting hypotheses await further research. Such research should be characterized by scientific rigor.

Investigations cannot be considered to afford more than tentative results or approximate generalizations where the investigators:

1. Fail to report the number of observations (369, 378, 382, 409)
2. Use a meager number of cases (398, 408, 412, 427)
3. Omit description of the measurement technic employed (365, 368, 381, 397)
4. Pool data obtained in part by one technic and in part by another (413)
5. Fail to differentiate the sexes (358, 367, 387)
6. Make comparisons of samples without showing that there are equal proportions of the two sexes in each sample (367)
7. Fail to mention the socio-economic status or racial stock of the subjects (367, 397)

8. Omit the method used to secure information on nationality (413, 449), first menstruation (368), or malnutrition (358)
9. Fail to indicate number of "accidental death" cases and number of cases of "death from disease" in sampling (408, 412, 427)
10. Fail to show that the experimental and control groups were equivalent with reference to the variables under study at the beginning of the experimental period (358)
11. Fail to make tabular analysis of findings (368, 369, 379, 382, 404, 410)
12. Do not indicate the measure of central tendency employed (365) and whether central tendencies were obtained from "full year" or "nearest birthday" distributions (452)
13. Apply standards based on one racial group to individuals of a different racial stock (417, 439)
14. Describe types of individual curves for various measurements without reporting whether all types are common to both sexes and with what frequency each type occurs (379, 382).

Longitudinal research—In 1895 Lincoln¹ attempted to show that further analysis in physical growth would fall short of their maximum significance unless the basic data were "continued observations on known individuals." During the forty-year period from Lincoln's paper to the present, frequent reiterations of this position have been made and a scattering of seriatim investigations has appeared. Today there is fairly wide recognition of the need for longitudinal research and numerous consecutive measurement studies are in progress. It is becoming increasingly evident, however, that to investigate the growth of the individual is a technically difficult task. Individual curves, drawn to observed values at reasonably frequent intervals, show spurious irregularities unless the values are highly reliable (415:102, 120). For the study of such problems as seasonal variation in growth or influence of disease on growth, the seriatim measurements must be made with great precision. Particularly in the case of transverse (width, depth, and girth) measurements of the body, changes in growth rate are a function of small differences in absolute magnitude.

Pattern research—Physical growth research to date has been largely patchwork research; that is, innumerable discrete investigations have been made but sequential investigations have been rare. Partial or superficial information is thus available on a great variety of problems, while few problems have been subjected to thorough study. The needed research is that which cumulatively emerges from a small number of clearly formulated and reasonably comprehensive problem clusters or research patterns. Such research, obviously, is adapted to the longitudinal method. In fact, it appears that longitudinal research is, at once, sterile unless it is rigorous, and unduly expensive unless it contributes to an organized pattern.

¹ Lincoln, D. F. "Anthropometry Individualized." *Report of the Tenth Annual Meeting of the American Association for the Advancement of Physical Education*. Concord, N. H.: Republican Press Assoc., 1896. p. 4-11.

CHAPTER V

Mental Development in Adolescence

THE DISCUSSION of mental development during adolescence is limited almost entirely to investigations reported in the United States, England, and other English speaking countries. No reference is made to the general bibliographies or abstracts covering mental and physical development because they are referred to in other chapters. For the same reason no reference is made to the literature on the problems of nature versus nurture in mental development during the teens.

As in other fields of research, the value of data on mental development during adolescence depends largely upon the methods employed. Since different rates of growth may be found among different individuals, on account of different environmental circumstances, or as the result of changes in environmental conditions, the selection of subjects for study is an important consideration in methodology. We scarcely need mention the necessity of using valid, reliable measuring instruments, since this is now regarded as an essential in all educational research. The instruments actually in use in measuring mental growth during adolescence are, however, far from satisfactory for that purpose. They do not meet the criticism leveled against them by Thurstone (494) who said of the Binet Scale: "It should be extended beyond the age of fourteen or sixteen by inserting tests on which older subjects succeed better than younger ones. It is difficult to find test questions of the ordinary type in which such differentiation is possible, but our inability to find them does not prove that the development of intelligence stops somewhere in the 'teens. Common sense judgment certainly favors the assumption that the average man of forty is more intelligent than the average boy of twenty, but so far we have not been able to measure that difference. Instead of acknowledging this limitation in our measurement methods, we have not infrequently attempted to juggle with the definition of intelligence to make it fit the measuring devices that are accessible." For the most part the tests now employed to determine mental development during adolescence are the same ones which were in use when Thurstone made this criticism. The writer (458) pointed out previously the relative value of retest and non-retest methods in determining development. By employing suitable measuring instruments and by using the retest method he secured data from which individual growth curves may be plotted. Such growth curves cannot be determined by testing large numbers of persons of each of the adolescent ages. Only a generalized curve can thus be found. Individual differences in mental development are concealed by non-retest data and significant laws of individual development cannot be drawn. However,

the generalized growth curve from non-retest data does seem to have some theoretical value, even though it involves the assumption that those tested at any given age do represent what those a year younger will be in one year, for example, that the sixteen-year-olds truly represent what the fifteen-year-olds will be when they are one year older. Adequate statistical or other analysis is necessary. Inadequate analysis often involves unconscious assumptions which are contrary to fact and thus make the results worthless. If, however, basic data are worthless, elaborate statistical techniques are likely to be of little value. In studying adolescent mental development, the way in which cases are selected should be known and other conditions affecting the results should be described. Cases selected at random are not necessarily a random sample nor does ignorance of the kind of sample drawn make it random. The inadequacies and limitations of many of the studies throwing light on the problems of mental development of adolescents arise from the fact that they were not planned primarily for that purpose.

Developmental studies should continue over a period of years so as to secure individual cumulative records. Often a research is begun, a tentative report is published, and then the research is abandoned. Perhaps there should be an unwritten law in educational research against such abandonment of "infant researches."

Research materials on mental development during adolescence are discussed under the following headings:

1. Age of cessation of mental development
2. Rate of mental growth; the mental growth curve during adolescence
3. Constancy of I.Q.
4. Range of individual differences in intelligence
5. Sex differences in mental development
6. Miscellaneous topics
7. Problems needing investigation.

Age of Cessation of Mental Development

Recent studies seem to support those reviewed in the April, 1933, issue of the *Review* indicating that mental growth continues beyond the age of thirteen or fourteen years, as was often inferred from mental testing in the army during the World War and from the widespread use of mental tests shortly thereafter.

Keen (478), Jones and Conrad (189), Miles and Miles (484), and Sorenson (489) used the non-retest method to determine the growth and decline of intelligence with age. Some of their results throw light on the age of cessation of mental growth. S. C. Garrison (472), McConnell (482), Freeman (468), Hollingworth and Kaunitz (173), Masters and Upshall (483), Baldwin (456), Moore (485), and Roberts (487) used the retest method. Keen (478) tested 200 children in thirty-five families, using the Stanford-Binet. Testing all of the children in large families would tend to give groups of different chronological ages and of homogeneity in

intelligence; but they would not be equivalent to retests of the same individuals. One could hardly agree with the author (478:737) on the following: ". . . since tests of siblings have demonstrated that there is a correlation of .50 or more between the children of a family, testing all the members of a large family at one time is roughly equivalent to testing a single individual at intervals corresponding to the age of each child," because a correlation of .50 does not imply any such relative equivalence.

E. L. Thorndike's view (492) that maximum mental development is reached at age twenty-two was dismissed with the comment that "because the factor of experience is partly responsible for high scores at the upper age levels, it seems safer to assume the maximum at twenty or below." At the present time, the effect of experience upon the scores of younger children is seldom denied.

Jones and Conrad (189) used the Army Alpha intelligence examination (Forms 5 and 7) with 1,191 individuals in rural New England, ages ten to sixty. The individuals were cases selected as to homogeneity in "economic status and educational opportunity." They were entirely native-born of native-born stock and came from relatively stationary, limited districts comprising nine counties in central and north central New England (Massachusetts, New Hampshire, and Vermont). At each age from ten to eighteen, from thirty-four to seventy-five individuals were tested; at ages nineteen to twenty-one inclusive, a total of eighty-seven. Mental growth, as indicated by the mean or median scores of each of these age groups, seemed to reach its high point sometime between the ages of eighteen and twenty-one years, with a decline thereafter. An analysis of growth as measured by each of the eight subtests of Army Alpha was given. It showed that on some subtests the high point of development was reached around eighteen years, especially in test 3 (commonsense), test 6 (numerical completion), and test 7 (analogies); that on others a slight rise continued into the early twenties as in test 1 (oral directions) and test 5 (dissected sentences); and that on other tests there seemed to be a slight rise well into advanced maturity, as in test 4 (the opposites) and test 8 (general information). The authors note that "a distinction needs to be made between the peak of development and the mental age of adults." They point out that "the latter phrase is, as a matter of fact, no more justifiable than would be the expression 'the mental age of children.'" This point is well taken for all ages following that at which the maximum is reached. Obviously if the status of mental ability, as measured by the Army Alpha, at age fifty-five is about the fourteen-year level, a mental age of fifty-five would have no useful meaning. The mental age concept could not be used to characterize adults after decline begins. This seems to be inherent in the meaning of mental age. The authors make a distinction between basic intelligence and acquired abilities. At ages ten to eighteen the opposites and general information tests contributed from 25 to 30 percent of the total score; at ages fifty to sixty approximately 40 percent. From this they concluded that: "As reported in mental tests, then, the effective

intellectual power of the adult, much more than that of the ten-year-old, is evidently derived from accumulative stocks of information." They seemed to find little evidence for a differential duration of growth between the bright and dull groups. They recognized a fundamental limitation of the non-retest method: "Any sweeping application of our average results to individual adults would be ill-advised." It seems clear that the best means of determining the age of cessation of mental growth is cumulative records from retests with proper allowance for practice effect and adequate care in respect to differences in motivation from one year to another. Even with the great care exercised by the authors in selecting the individuals for testing, conclusions must of necessity be highly tentative when based upon thirty-four to seventy-five different individuals of each of the ages up to eighteen and from thirty-three to 106 for each of the five-year age periods after twenty-one.

Miles and Miles (484) used the first sixty items in the Otis Self-Administering Test of Intelligence, Higher Examination, Form A with a fifteen-minute time limit. The examination was administered as an individual test to 823 persons ranging in age from seven to ninety-four years. From thirty-eight to fifty-one individuals were tested in each five-year age group from fifteen to forty-nine. Considerable care was used to secure good sampling of the literate citizens in each of two towns, particularly individuals who would "be homogeneous in general mental character from age to age." Although the numbers chosen may be large enough "for statistical reliability," the authors recognized that "conclusive evidence regarding the relation of age to intelligence test score will, of course, not be available until scores have been obtained year after year from childhood until old age from the same members of large representative populations." Conclusions about the age at which mental growth reaches its peak are hardly justifiable from the mean or median scores of fifty-one individuals ages fifteen to nineteen years, or forty individuals ages twenty to twenty-four years, or thirty-eight individuals twenty-five to twenty-nine years of age. If the data are taken at face value, mental growth seems to reach its peak sometime around the eighteenth or nineteenth year. We question seriously, however, the validity and reliability of conclusions based upon a fifteen-minute non-retest of approximately eight to ten individuals of each chronological age.

Sorenson (489) attacked the same problem, using a one-hour vocabulary test of 480 items and a reading test consisting of a six-minute vocabulary section of 100 items and a forty-minute paragraph reading section of thirty-five items. He selected 641 individuals from approximately 5,500 students attending late afternoon and evening classes of the General Extension Division of the University of Minnesota so as to have approximately seventy-five individuals for each five-year age group up to the bases of their years of schooling and their occupational status. The author noted that "the younger adults had not reached as high an occu-

pational level as had the older adults, nor had they completed quite as many years of schooling." Accordingly, those under twenty-five years of age were not as well selected as those older, but their full-time education was more recent. Taken at face value, the smoothed curves for vocabulary indicated the peak of development at the highest age tested. Paragraph reading scores, however, showed marked fluctuations; they were higher at twenty-two to twenty-four than at fifteen to nineteen. The smoothed curve from fifteen to sixty was a straight line with zero slope. The author pointed out that "vocabularies have been described as the best single tests of general intelligence," but that "possibly this does not apply to the intelligence of adults." His results roughly agreed with those of Jones and Conrad for the Army Alpha subtests for opposites and general information. Sorenson (489) argued as follows:

One hardly dares to venture the statement, on the basis of these findings, that the intelligence of adolescents increases with age. Conceivably one can acquire a bigger vocabulary by living in an intellectually rich environment. Increased vocabulary then may not represent real mental growth. On the other hand, decreasing mental test ability of adults with age may not represent actual deterioration of real or intrinsic capacity. A decrease in test ability among adults probably is caused by the fact that adults, as they grow older, exercise their minds less and less with the materials found in psychological tests. It is the writer's opinion that most people's mental abilities begin to decline with their graduation from high school or college unless a vigorous post-school environment demands active mentation.¹

Sorenson emphasized the effect of forgetting or lack of practice shown by adults as they get older. If it is true, as Kelley has pointed out, that presentday mental tests and batteries of educational tests have 90 percent community of function, then mental tests are made up largely of school materials and disuse would have something of the effect which Sorenson suggested. He also held that training, schooling, or practice determines very largely adult mental ability and that the mentality of pre-adults depends largely upon inherent mental growth or maturation and school training or practice. He expressed the view that "nature helps a pre-adult grow mentally to the age of twenty," although no evidence is available from his own investigation to support it.

S. C. Garrison (472) used the Yerkes-Bridges-Hardwick point scale in re-testing thirty-two men and forty-one women after an interval of ten years. The average age of the men at the first testing was 30.4 years; that of the women 26.4 years. These were teachers attending the summer school of Peabody College. The men's scores were slightly higher when retested (that is, at age forty) than when first tested. The women's scores when retested (that is, at age thirty-six) were also slightly more than upon the first testing. The gains, however, were not significant, being but two-thirds to one and one-sixteenth times their standard errors. These data seem to indicate that these adults did about as well on the mental test at the age

¹ See Brooks (458:112) for a discussion of inadequacy of tests now used to measure growth of intelligence during and after adolescence.

of thirty-five or forty as at twenty-five or thirty. Whether they would have done better at an earlier age is unknown from the data available.

McConnell (482) retested seventy members of the senior class of 1932 at Cornell College, using the 1928 edition of the American Council Psychological Examination. These students had taken the 1927 edition as freshmen in September, 1928. Using Thurstone's equivalent scores on the early forms of the test, McConnell transmuted the 1927 scores into their 1928 equivalents. The ages were not given but they were probably around seventeen or eighteen at the time of the first test and approximately three and one-half years more at the retesting. The mean retest score was 185.2 and the original 144.8. The difference of slightly more than 40 points is more than eighteen times its probable error and is statistically significant. McConnell pointed out that the increase in scores may be due to some combination of the following factors: growth in an underlying capacity, growth in effective use of endowment, specific training and varying sets, emotional states, motivation as well as conditions under which the test was administered. Thus the increase in score on the analogies "might reflect refinement of habits of observation, analysis, and systematic effort to discover relationship." Increase of score on the artificial language test might be the result of the acquisition of better methods of attack on language learning situations. Then too, instruction in college may affect directly the students' performance on the examination. McConnell also pointed out that, although the emotional state of many freshmen while taking an intelligence examination was not conducive to the best performance, the average increase in score from freshman to senior year probably was not due to the better poise of the seniors because "these students as freshmen were more concerned with making good scores than they were as seniors." Of course college students represent a highly selected group, living under presumably intellectually stimulating conditions, and these results do not have significance for general population.

Freeman (468) reported results from the Chicago growth study. Repeated tests from several hundred children have been continued over a period of ten years. Many individuals were retested at the age of seventeen or eighteen years when graduating from the University of Chicago Laboratory Schools. A few were retested in college. A composite of four standardized tests (vocabulary, analogies, completion, and opposites) was used. The growth curves drawn from the raw scores showed mental development continuing well beyond the age of seventeen or eighteen years. Some evidence indicated that children of average ability might continue intellectual growth to a somewhat later age than the brighter children. Hollingworth and Kaunitz (173) retested 116 gifted children (Stanford-Binet I.Q. above 132) after an interval of ten years. Fifty-two of these were tested with Army Alpha at age of fifteen and again with a different form of Army Alpha four years later. The scores were noticeably higher at the later time. Hollingworth concluded that the group at the age of nineteen was close

to maturity and "that subsequent increments for growth [as measured on Army Alpha?] will be slight if any." Some individuals' scores at fifteen were almost as large as at nineteen.

Masters and Upshall (483) reported retests using one or two forms of Part I of the Thorndike Intelligence Examination for High School Graduates. Three groups of students in the Bellingham, Washington, Normal School were used. The first consisted of 125 students first tested October, 1928, and retested in May, 1930; the second group of 113 was first tested in October, 1929, and retested in May, 1931; the third group of 125 was first tested in October, 1931, and retested in January, 1932, after an interval of three months. The average age of these three groups at the first testing was eighteen years. The average gain of the first group was 28 times its probable error, of the second group 26 times its probable error, and the third group 8 times its probable error. These results indicate a gain even for a three-month period which might be interpreted as practice effect; but the two groups tested at the beginning and the end of the two-year normal school course made gains which cannot be explained on the basis of practice effect. If the gain of the third group, tested after an interval of three months, be regarded as practice effect, the net gain of the other two groups would still be from 16 to 18 times their probable errors. The authors pointed out that the amount of time elapsing between high-school graduation and entrance into normal school bore no relation to the amount of gain from the beginning to the end of the two-year normal course, nor did age of entrance seem to have any part in determining the amount of gain. From a study of the gains of these groups on achievement tests (arithmetic reasoning and computation, English usage, history, and geography) they found that the gain on the Thorndike Intelligence Examination was considerably greater than on any of the five achievement tests used. They then faced the difficulty of (a) relatively large gains on the Thorndike Intelligence Examination from the eighteenth to the twentieth years; and (b) the frequently mentioned view that native intelligence ceases to grow after the age of sixteen years. They accepted the latter as basic and concluded that the Thorndike Intelligence Examination for High School Graduates, Part I, "is not a valid measure of general intelligence as that term is commonly defined and used." Brooks (459), Dearborn (463), E. L. Thorndike (493), Thurstone (494), and others have discussed this matter previously. We do not see the justification for calling increase in scores on an intelligence examination before age sixteen growth of native intelligence and then calling increase in scores on the same examination after age sixteen something else.

Baldwin (456) used a T-score scaling of the American Council Psychological Examination editions of 1924 to 1928 for testing and retesting students at the University of Kansas. The interval between tests and retests varied from one day to three years. Sixty-two students from freshman to senior year made a net gain (practice effect deducted) of 3.12 T-scale units (.312 standard deviation). This gain was 5 times its standard error.

Teagarden (491) found a gain of 8 T-scale units from thirteen to eighteen years. Other data indicated the curve was still rising in the senior year.

Moore (485) found that twenty-nine young students in college (graduating from high-school before age sixteen) when tested at sixteen, eighteen, and twenty years of age made Otis gross scores of 58, 63, and 67; the number was so small that the gains were not statistically significant. The scores, however, of approximately 1,200 high-school graduates (chronological age approximately eighteen, twenty, and twenty-two years at three testings) were 54, 59, and 63. These gains were statistically significant.

Roberts (487) studied 100 graduates in engineering and 100 graduates in liberal arts at the University of Kansas who had attended eight consecutive semesters. The average grade points increased slightly, from 1.61 to 1.71 for the engineers and from 1.51 to 1.81 for liberal arts. He says: "The average grade-point of the group studied increases in size during the eight semesters. This rise in grade points is due to the growth or maturation of the students. The students meet the situations in which they find themselves more and more intelligently which means that they are growing in intelligence." However, Roberts did not regard the marked drop in grade points in the sophomore year as evidence of a loss of intelligence. In view of the unreliability and subjectivity of marks and the varying bases of assigning them, one may fairly ask with what degree of precision increase in average grade points from year to year in college does measure intellectual growth. One may well question the equality of the units of measurement.

Stroud and Maul (314) found that ability to memorize poetry and nonsense syllables (measured by a fifteen-minute test and a ten-minute test, respectively) was greatest in a group of twenty-eight college freshmen, average chronological age 18 years; next greatest in twenty-six ninth-grade students, average chronological age 14.4 years; and that the score decreased at each age from eleven to seven years in the case of the 172 children tested at these five ages. Since (a) the number was small; (b) the individuals selected were not homogeneous in intelligence; (c) no retests were made; and (d) the equality of the units of measurement was unknown (the scores were the number of lines of poetry learned or the number of nonsense syllables learned and the relative difficulty of each might vary), no conclusions may be drawn about the age of cessation of growth or the rate of growth of this function.

Rate of Mental Growth

Jones and Conrad (189) presented growth curves for total Army Alpha and its eight subtests, basing them upon non-retest data of nearly 1,200 individuals, ages ten to sixty years, selected as indicated in an earlier section of this chapter (p. 87). Using 290 adults, ages twenty-five to thirty-nine years, they found T-score rescaling closely equivalent to Thorndike equal-unit rescaling. Growth curves were based upon T-scores and support the commonly accepted view of negative acceleration in the middle

and late teens. A discussion of statistical technics included a treatment of methods of curve-fitting which is particularly in point: "As we have just implied, *there is no single, correct mathematical solution*. We hear about 'the least squares solution,' when, as a matter of fact, any given set of data permits of numerous solutions, all depending on the type and degree of curve selected." Citations to Kelley (479), and Ezekiel (466) were given in support of their position.

Freeman (468) pointed out that retest raw scores showed differential rates of growth for bright and average adolescents which suggested that the average child may continue to grow intellectually somewhat longer than the bright ones. Data on equality of units of measurement are not given. Baldwin (456) reported negative acceleration in rate of growth for University of Kansas students from freshman to senior year, although the curve was plotted from one-year, two-year, and three-year gains made by different groups of students. The curve did not represent gains made by the same individuals during different intervals of time. Keen (478) attempted to plot a mental growth curve directly from the Stanford-Binet mental ages by choosing a vertical scale which assumed that the unit of measurement (one year of Stanford-Binet mental age) is equal throughout the entire age range, that is, that mental growth from eleven to twelve years equals growth from fifteen to sixteen or nineteen to twenty years.

A highly accurate measure of the rate of intellectual growth during adolescence has not yet been secured, even though several lines of evidence seem to point to a marked slowing down in the late teens.

Constancy of the I.Q.

Testing programs have been carried on long enough now for many cumulative records to be made. The methods used in studying constancy of the I.Q. have been (a) finding correlations between the I.Q.'s on two or more testings; and (b) finding the central tendency of differences in I.Q.'s or the Q. of differences in I.Q.'s on test and retest. If chronological age is partialled out or eliminated by grouping so as to avoid spurious index correlation, the correlation technic shows the relative ranks on test and retest, but it does not indicate the amount of variation in I.Q.'s from one testing to another. In order to know how constant a child's I.Q. is, the actual difference between test and retest I.Q. for each individual should be calculated and then these differences given suitable statistical treatment. Reports are now appearing on the constancy of the I.Q. in relation to the length of time elapsing between test and retest. Conclusions on constancy, based upon indiscriminate averaging after intervals of varying lengths of time, will have to be modified in the light of this more recent type of investigation. The effect of time upon constancy has been studied by Brown (106), R. L. Thorndike (318), Lorge (481), and Hollingworth and Kaunitz (173).

Brown (106) analyzed data on retests of 124 problem children tested

in the Chicago Institute of Juvenile Research and retested after intervals of time varying from one month to 145 months. The Stanford-Binet test was used. The average change in I.Q. was least for those retested after an interval of one to twelve months. It was greater for those retested after twelve to twenty-four months, still greater for those retested after twenty-four to thirty-six months, etc., being greatest after six to seven years. The amount of change in I.Q. upon retest was somewhat smaller for those tested at intervals of more than seven years. Since not all of those retested at any one of these intervals were retested at all other intervals, these data are not entirely conclusive. However, fifty-eight individuals who were retested after one to twenty-four months were also retested after sixty to 145 months. The total average of individual changes in I.Q. was 5.8 points and 10.7 points, respectively. For 124 individuals retested after an interval of sixty to 145 months, the average of individual changes in I.Q. was 10.4 points. Age at time of retest was also considered in respect to the amount of change in I.Q. Thus the average change in I.Q. was 11.6 points for seventy-four individuals under sixteen years at final retest and 8.7 points for fifty individuals who were sixteen years or older at the last retest.

R. L. Thorndike (318) used the correlations between test and retest I.Q.'s reported by thirteen previous investigators to determine the effect of time interval (t) upon the constancy of I.Q. He fitted curves to the data (thirty-six correlations in which t ranged from zero to sixty months) and found that the theoretical coefficients ranged from r equals .89 when t equals 0, to r equals .70 when t equals 60 months. A second degree curve gave very little better fit than the linear, so the theoretical coefficients were determined by the latter. In this study the constancy of I.Q. at various ages was not studied, so no conclusions may be drawn from it on the correlations likely to be found between the I.Q.'s of adolescents of different ages when retested after varying intervals of time. Lorge (481) reported correlations upon scores of approximately 160 boys who were tested at the age of thirteen to fifteen years on the Thorndike-McCall reading scale, I.E.R. arithmetic test, Stenquist assembly test, and I.E.R. general clerical test, and retested on the same tests after an interval of ten years. The correlations ranged from .57 to .66, those on the Stenquist assembly test being highest. In the case of fifty-three girls the correlations between tests and retests on similar materials after an interval of five months were slightly higher. Possible causes of lowered coefficients after longer intervals of time were listed as initial reliability of tests, growth, environmental factors in time, and limitations of the tests themselves, the latter being regarded as the probable primary factor since tests usually are designed for a limited age or grade range. Hollingworth and Kaunitz (173) studied the results of retesting 116 gifted children who were in the top centile when first tested on the Stanford-Binet ten years earlier. The retest came when they were all near maturity and was designed

to see if they maintained their high rank in intelligence. The Army Alpha scale was used for the retest. It showed that 82 percent of them made scores which would place them in the top centile of the military draft by Army Alpha. This was taken as evidence that gifted children tend to maintain their superiority (as measured by a verbal intelligence test) at maturity.

Rappaport (486) studied the effect upon constancy of I.Q. of using chronological ages fourteen, fifteen, and sixteen years as divisors in computing the I.Q. He used 150 clinical cases to whom the Stanford-Binet had been given before and after the age of fourteen in the Child Study Department of the Rochester Society for the Prevention of Cruelty to Children. The mean I.Q. was 80. The average time between initial and final tests was slightly more than four years. Cases were eliminated in which the element of emotional upset was present. The mean arithmetic deviation of those sixteen years of age and older at retest was 6.2 points. For those sixteen years of age or older at retest, sixteen years chronological age was the best divisor in finding I.Q., since it showed least change in I.Q. from test to retest; fifteen years as divisor showed slightly greater change, whereas fourteen years showed the greatest. Constancy, as measured by coefficients of correlation, was in the .80's. The effect of time between testings upon the constancy of I.Q. was not reported.

Lincoln (480) found changes in Stanford-Binet I.Q.'s of forty-five gifted boys and sixty-four gifted girls retested after an interval of five to eight years. The median changes were 8.1 points. Many of these were adolescents when retested. The mean I.Q.'s of the boys were slightly higher on the final than on the initial test; those of the girls were 4 or 5 points lower. A measure of the constancy of the I.Q.'s of gifted children is the extent to which later retests show them decreasing to the "average" group. This study showed the I.Q.'s of 13 percent of the boys and 22 percent of the girls dropping below 110 at the final test. The conclusion was reached that superior children tend to remain superior. We are inclined to believe that part of the drop in I.Q. was caused by the limitations of the Stanford-Binet at the higher ages.

Some of the cases tested by Lithauer and Klineberg (212) and by Gildea and Macoubrey (157) were adolescents. Lithauer and Klineberg found that the correlation between length of interval of time from test to retest (three to fifty-seven months) and amount of change in I.Q. was not significant. A preferable technic would be to find the actual amount of change in I.Q. for different intervals of time. Gildea and Macoubrey (157) sought to determine some of the factors affecting constancy of I.Q. of problem children. They matched for age, sex, and initial I.Q. seventy-three individuals whose I.Q.'s changed more than 10 points from test to retest with a group whose I.Q.'s changed 5 points or less. Degree of cooperation, attitude toward examiner, and speed on test were not related to variability in I.Q. Improvement in physical condition, parental attitudes, and symptomatic behavior were associated with variability in I.Q.

Range of Individual Differences

To determine the range of individual differences in mental traits, some measure of absolute variability should be used such as the standard deviation, Q ., or range, rather than a measure of relative variability such as the Pearson coefficient of variation. The latter has much value in rendering variability comparable when different units of measurement have been used, such as measures of height, weight, and mental ability, and for other purposes, but if we are seeking to know the range of differences, a measure of absolute variability should be used.

The standard deviations of abbreviated Otis scores reported by Miles and Miles (484) for certain age groups were greatest at fifteen to sixteen years, next greatest at eleven to twelve, then at seventeen to eighteen, and least at thirteen to fourteen; but no reliance can be placed upon non-retest results of seventeen to thirty-five cases at each two-year-age group. According to data from Jones and Conrad (189), the standard deviations of Army Alpha scores increased from eleven to twenty-one with one exception; it was slightly less for the seventeen-year-olds tested than for the sixteen-year-olds. This may have been the result of selection. At any rate, we cannot know conclusively from non-retest data whether the range of individual differences in mental ability increases, decreases, or remains constant as children pass to early maturity and late adolescence.

According to McConnell (482), college students showed slightly greater variability on the American Council Psychological Examination as seniors than as freshmen, although the difference in variability was but 58 percent of its probable error. Baldwin (456) also found a slight increase in standard deviation from freshman to senior year in college on the American Council tests. On the other hand, Masters and Upshall (483) found normal school students slightly less variable on Part I of the Thorndike Intelligence Examination for High-School Graduates at the end of their two-year course than at the beginning, but a group retested after a three-month interval was slightly more variable than when first tested. The differences in variability, however, were not statistically significant. Moore (485) also found a very slight decrease in Q . of Otis scores of high-school graduates tested at ages sixteen, eighteen, and twenty years, and at ages eighteen, twenty, and twenty-two years. The retests reported by S. C. Garrison (472) covered individuals beyond adolescence at the first testing. On the retest ten years later they were slightly more variable but the differences in the standard deviations were only one to two times their standard errors. Brown (106) showed that the range of individual differences in Stanford-Binet mental age and I.Q. of 124 problem children tested at the Chicago Institute for Juvenile Research increased from the first test (average chronological age 8.2 years) to the retest (average chronological age 15.9 years), the mental age ranges being 9.8 years and 15.3 years respectively, and the I.Q. ranges, 85 and 117 respectively.

Sex Differences

Wellman (495) discussed sex differences in intelligence and gave a bibliography of 249 titles covering the more significant literature through 1932. On pages 629 to 630 she discussed sex differences in intelligence at adolescence.

Conrad, Jones, and Hsiao (120) reported sex differences of 271 boys and 238 girls, ages twelve to twenty-one on Army Alpha and each of its subtests. These individuals were selected, as indicated in an earlier section of this chapter, as to homogeneity in economic status and educational opportunity and were native-born of native-born stock from relatively stationary rural districts. Girls at all of these ages excelled the boys on the total Alpha score. They also excelled at all or nearly all of these ages on oral directions, commonsense, opposites, dissected sentences, and analogies. Boys at the later teen ages excelled girls in arithmetic problems and general information. The authors concluded that girls show a slight superiority over boys, the difference being greater during early adolescence; but at no age was it great enough to have any practical significance. The younger men and women tested and retested by S. C. Garrison (472) showed slight but unimportant differences on the Yerkes-Bridges-Hardwick scale in favor of the men. This was also true of the entire group of 541 adults. The thirty-two men tested and retested at an interval of ten years made slightly lower average scores than the forty-one women tested at the same times. The differences were too small to be statistically significant. Since selection was primarily enrolment in summer school classes in psychology, the group could not be regarded as representative of the two sexes.

Goodman (473) studied sex differences of nearly 1,400 New Haven high-school students who had failed one or more subjects. Nearly half of them had failed to graduate. Boys I.Q.'s (name of intelligence test used not given) average 5.1 points higher than those of girls, the critical ratio of this difference being 7.13. Dietze (464) compared immediate factual memory for printed material read by approximately 650 pairs of boys and girls (ages eleven to nineteen years) paired by age and grade. The tests were multiple choice of "a highly satisfactory degree of objectivity, reliability, and validity." On the whole, boys slightly excelled girls, the greatest difference being on a factual article on radium in which boys undoubtedly had greater interest than girls. The differences for three different sex paired groups on three different kinds of material were, respectively, 5, 1.5, and 3 times their probable errors. Wyatt (498) compared the sex differences of nearly 1,000 individuals (most of whom were from grades seven to twelve) on free word association. While the technic requires much time, some valuable data may be secured. Thus males showed a marked preference for feminine nouns, females a less marked preference for masculine nouns; this result "suggests that thinking of the opposite sex is stronger in males than in females, and that not only at the school age."

Hurd (476) reported sex differences in achievement on a unit of high-school physics. He selected 134 boys and 134 girls from more than 1,300 pupils in fifty-three classes in thirty-four schools. They were matched in age, grade, and instructor. Matching by age-grade status was used as a rough means of equating the groups in intelligence and since the members of each pair were under the same instructor for eighteen class periods of forty-five minutes each, the differences between preliminary and final tests were expected to depend "on inherent sex differences or different earlier training due to sex." The achievement test used had a reliability coefficient of .957. Boys' initial and final scores were higher than those of the girls. The difference between the sexes on the initial test was 9.8 times its standard error; on the final test it was 2.6 times its standard error. Girls gained more than boys, the difference in gain being 2.7 times its standard error.

Several studies on sex differences in mathematics have been made. Two of these were made by Foran and O'Hara (467) and by Eells and Fox (465). Foran and O'Hara (467) compared the scores of approximately 500 boys and 500 girls on the Webb geometry test in the Catholic high-schools of an eastern city. The boys made better scores than the girls, only 27 percent of the girls equaling or exceeding the boys' median. The difference was 9 times its standard error. The two sexes were almost the same in intelligence (measured by the Terman group test), the difference being but three-fifths of its standard error. The boys were clearly superior on four of the five parts of the test. The coefficient of variability of geometry scores was greater for girls than for boys, but the actual range of scores was probably greater for boys than for girls since the standard deviation of boys' scores was greater than the standard deviation of the girls' scores. Eells and Fox (465) compared the mathematics scores on the Iowa High School Content Examination of 6,000 men and women entering the freshman class in forty-seven junior colleges in California. They were all "low" freshmen. The men's mean score exceeded that of the women by an amount which was 40 times its probable error. The American Council Psychological Examination showed the men slightly superior to the women but the difference was not significant. The men, however, had taken approximately one-third more units of mathematics in high school than the girls. When compared according to units of mathematics in high school, the differences were still in favor of the men and were statistically significant for all who had three units or less of high-school mathematics. Approximately 100 of each sex had had no units of mathematics in high-school. Here again the men's scores were much greater than those of the women, the difference being 8 times its probable error.

Carroll (460) studied sex differences in the appreciation of literature, using the Carroll Prose Appreciation Test with 1,200 high-school students (100 boys and 100 girls of each grade from seven to twelve) and 100 college men and 100 college women. All subjects were reported as selected at random, although details of such selection were not given. The average

scores of the girls in each grade were better than those of the boys, the critical ratios of the differences ranging from 3.7 to 8.6 (except in the eighth grade where it was 2.2). At the college level, 34 percent of the boys exceeded the girls' median; at the senior high-school level 30.9 percent; and at the junior high-school level 37.5 percent. Girls' standard deviations were greater in all groups (same in the tenth grade) but the variability coefficients were roughly the same. The range of scores varied, the girls' range being exceeded by the boys' only in grades eight and ten. Girls also made twice as many high scores as boys, whereas the latter made 58 percent of the lowest scores. To the extent that the test is a valid, reliable one and the sample really was random, clear and distinct sex differences were shown.

Miscellaneous Topics

Junge (477) studied the development of perception of complex relationships in the case of 522 individuals ages ten to fourteen years. The method used was to show two films under identical conditions, the subjects then writing descriptions of each film. Two reports, judged to be typical, were selected for each sex at each age and were analyzed. From these analyses, the author concluded that from the age of ten to fourteen "apperception" develops gradually. The method does not permit a quantitative expression of development.

Schmidt (488) conducted experiments with 200 boys ages nine to nineteen years, having them describe pictures. He concluded from a study of their descriptions that correct global perception begins at about the age of thirteen or fourteen years and that criticism and evaluation begin about the same time. Here again rate of development cannot be stated in quantitative terms. Cser (462), in the Municipal Pedagogical Psychological Laboratory in Budapest, studied the power of attention of 710 boys and 789 girls ages ten to fourteen years. They worked at a special kind of addition for a ten-minute period, the amount of work for each minute being calculated. There seemed to be a slowing down at fourteen years with greater individual differences. The boys seemed to be more rapid but less accurate than the girls. One cannot be sure, however, that the slowing down may not be a function of the difficulty of the test itself rather than a characteristic of development.

Witty and Lehman (497) used a questionnaire to study the reading preferences of a group of fifty intellectually gifted adolescents, I.Q.'s above 140. They were tested three times, the average ages being 10 years, 6 months; 15 years, 6 months; and 17 years, 6 months. Each individual listed the names of books which he preferred and checked his first, second, and third preferences on a printed list of fourteen types of reading material. From these answers the changes in reading preference with age were indicated. Bologna (457) studied the reading interests of 2,935 public school and high-school boys and girls ages eight to twenty years

and drew conclusions on the ages at which various kinds of reading materials were of most interest. The author interpreted his findings as showing the following important incentives for reading; love of adventure until the age of fifteen; then eroticism; and still later, interest in knowledge and science. Wells (496) studied the tastes of 400 junior-senior high-school pupils for humorous literature, using forty samples of humorous literature from a wide variety of sources. In all grades the order of preference was absurdity, slap-stick, satire, or whimsy.

A fundamental difficulty in all questionnaire studies is to know how valid the results are. Some evidence exists showing that writing answers to questionnaires does not give the same results as putting check marks before items printed in a list; that is, if children are given a long list of books to check the ones they like best, the results are not likely to be the same as if they are merely asked to write a list of the books in the order of their preference. Attempts at the validation of interest questionnaires (the interview technic) involve the research worker in other difficulties. The intimate study of individuals by which the actual reading done from day to day for a short period of time is followed by a similar study of the same individuals for a short interval of time at a later age is difficult to carry on but probably will yield more valid results. Experimental and laboratory schools with their well-trained staffs and greater facilities for cumulative, individual records are in the best position to carry on such studies—subject, of course, to the possible limitation of selection of students above average in ability and socio-economic status.

Garrett, Bryan, and Perl (470) investigated the relationships of certain mental abilities at ages nine, twelve, and fifteen years, using a battery of six memory and four non-memory tests with 125 individuals of each sex and age. Analysis of correlations indicated that all tests measured much the same ability. They could not separate memory or retentivity from general intelligence at these three age levels. The part played by general ability seemed to decrease with age and that played by special abilities to increase with age. If this is true at later ages of adolescence and in adult years it may throw light on Sorenson's (489) and Jones and Conrad's (189) results from vocabulary, opposites, and general information.

Conklin (461) and K. C. Garrison (471) have brought out textbooks on adolescence which use the research literature on the topics discussed. Hollingworth (475) discussed some of the problems of adolescence and presented a bibliography of 100 titled to 1933.

Problems Needing Investigation

Probably the most pressing needs in research on mental development in adolescence include the following:

1. Measuring instruments suitable for measuring mental development in the late teens and early twenties which can be used to secure valid, reliable, developmental data on individuals. Thurstone's method of scaling data applied to the Stanford-Binet

or other tests gives a generalized curve, but yields no individual growth curves. Tests are needed which can be repeated at consecutive ages through adolescence and into adult life, if it is possible to construct them.

2. With such tests available, the retest method can be used to attack some of the major problems of adolescent mental development with a reasonable chance of finding satisfactory solutions. Such problems as those on which we have presented data from recent researches might well be attacked, as the following: (1) Determination of the actual individual mental growth curves of many persons living under a wide diversity of environmental conditions and with notable changes occurring in environment at different ages. Such studies would show: (a) the probable peak of mental development for individuals of varying degrees of intelligence under divergent environments; (b) divergence, convergence, or parallelism of curves of mental development under specified conditions and for individuals of various grades of ability; (c) sex differences as a function of age, ability, and differential environments; (d) individual variations in mental growth or the constancy of the I.Q. at adolescence. (2) A series of researches on problems of relationships involving mental ability and mental development, as discussed in Chapter VI.

CHAPTER VI

Relationships in Physical and Mental Development

THE PREVIOUS REVIEW on this topic (560), in the April, 1933, issue of the *Review of Educational Research*, reported results from over one hundred studies of physical-mental relationship. The variables considered were (a) anthropometric measurements, body build indexes, physical condition, anatomical or physiological age; and (b) intelligence measurements, scholarship, or other indexes of mental accomplishment or efficiency. The conclusion was reached that the correlation between any one measure of physical size (age constant) and any one measure of mental status was uniformly too low for predictive purposes, usually below .30 and quite commonly between .10 and .20. The use of compound physical traits, such as morphological indexes, or of developmental measures such as those based on dentition, pubescence, or physiological age in general failed to give indications of higher relationship. These results conform with theories which emphasize the relatively specific and independent character of human traits. Investigators have nevertheless been unwilling to abandon this field of research. Continued interest in the subject may be attributed to the following factors: (a) physical traits are objective, easily definable, easily measured (if they can be utilized in the prediction of other less easily measured aspects of growth, they will be of distinct value in research and in educational programs); (b) the concepts of "integration" and the "organism as a whole" have led to the conviction that in some manner structural and behavioral traits are significantly related, even though ordinary mass statistical methods fail to reveal this relationship; and (c) clinical indications of the intellectual effects of illness, physical handicap, endocrine dysfunction, etc., have led to attempts to place such evidence on a more quantitative basis.

A variety of suggestions has been offered as to the direction which further research should take. Paterson (592) indicated as important problems the relation between physical development and mental development at the preschool level, the investigation of nutritional relationships and of the physical basis of "stamina," and, in collaboration with physicians, the determination of the psychological effects of illness and of specific medical and surgical procedures. Minimizing results from comparisons of "ready-made" groups, Paterson advocates the use either of experimental technics or of correlational methods limited to single age levels. The present reviewer (560), after listing some of the difficulties involved in drawing conclusions from correlational material, suggested: "Our next stage of research must place its emphasis not in mass correlations but in individual growth studies, pursued intensively and with particular attention to

concomitant changes in curves which express physiological functions, physical growth, and mental development."

Dearborn (383), accepting the above formulation, called attention to the fact that he has directed research of this character in connection with a twelve-year growth study in Massachusetts. He presented the following summary of findings, derived for the most part from doctoral dissertations in the Harvard School of Education:¹

Correlation coefficients between carpal development and speed or quality of handwriting were found to be zero (Wittler).

Four hundred and thirty-eight coefficients of correlation between IQ and anthropometric measurements, mostly head measurements, have been presented by Estabrook. The average for girls was $+.06$; for boys $+.14$. The coefficients were higher for boys than for girls in every one of the eleven measurements.

Correlation coefficients between mental ages and Prescott's anatomic index within narrow age-range groups or when age was partialled out varied from $+.28$ to $+.03$. The anatomic rating of the children in a school for the feeble-minded was found to be about one year below the public school children (Prescott).

C. W. Smith found no relationship between Prescott's anatomic index and mental development. The coefficients between mental age and anatomic index obtained by Cattell for eight groups of from 50 to 100 cases averaged $+.04$. Wheeler found the dull children to be slightly but consistently below the average in anatomic development.

Correlation coefficients between dentition and mental age in one-year age groups varied from $+.04$ to $+.12$.

The anthropometric measurements of those pupils with IQ's below 90 have been compared with the total group. The measurements of the dull group are slightly, but consistently, below the average of the unselected group. In general about 65 percent of the subnormal were below the median of the unselected group (Wheeler). Similarly, those pupils with IQ's above 110 were found to be slightly but consistently above the average of the unselected group (Agee).

The difference between the height and weight of the children in the school for the feeble-minded was further below the unselected group than the dull children; namely, one year at the age of seven and three years at the age of seventeen. The adolescent spurt in growth took place about two years earlier than it did in the normal group (Smith).

The correlation coefficients between head measurements and intelligence are approximately the same as those between height and intelligence; i.e., about $r = +.15$ (Estabrook). When several physical measurements are combined the correlation coefficients are raised to around $+.20$ or $+.30$ (Latshaw, Cattell).

For the purpose of determining whether or not large or small annual increments of growth had any influence on school achievement, a group of over 1,000 children were studied during the two-year period in which on the average the greatest growth takes place. The methods of study were: correlation coefficients, comparisons of extreme groups and case studies of pupils who had made unusual gain or lack of gain in physical growth or school achievement. No relationship between spurts or lags in physical growth and achievement in school subjects was found (Hobson).

It does not appear to the reviewer that these investigations, as summarized, answer the questions previously raised as to the limitations of the customary type of correlational studies. Although dealing with cumulative data, the technics are primarily cross-sectional. It is only in the last study mentioned, by Hobson, that use is made of incremental data as such.

¹ Note also Lincoln's summary of the Harvard Growth Study (411).

In subsequent reports from this rich accumulation of records, the unique advantages of cumulative material will no doubt be more fully exploited. At the present time the Harvard contributions, both as to methods and results, appear to fall in line with the general body of mass statistical investigations which have indicated either little or no correspondence between physical and mental variables.

A number of other recent correlational studies may be mentioned. Lazarfeld (572) found no consistent positive correlation between size and intelligence. Bissett and Laslett (366), reporting on 350 high-school boys, found a negative correlation of $-.185$ between Miller Group Test I.Q. and height, and $-.41$ between I.Q. and weight. They seemed impressed by the unusual finding of negative r 's, and stated that they have "no explanation to offer for this apparent anomaly." The anomaly is not in the correlations, but in the sampling represented. The school population ranged in age from thirteen to over twenty-one years. In such a group, selected on the basis of representation in a senior high school, the youngest, smallest individuals will of course be precocious children with high I.Q.'s, and the older, larger individuals will be grade repeaters with lower I.Q.'s.

In a group of New York college freshmen, Harris (554) found correlations of $.10 \pm .04$ between weight and intelligence (Army Alpha) and $.14 \pm .04$ between height and intelligence. Similar non-significant correlations were reported by Gittings (549) for Arizona freshman women: weight and intelligence (Army Alpha) $.19 \pm .11$; height and intelligence $.18 \pm .11$. Because of restricted range in the mental test scores, coefficients of correlation among college students may be expected to be lower than in an unselected school group. As representative of the latter, Stoke's results (621) may be quoted. For 499 children the correlation between I.Q. and a height index based on age and sex was $.20 \pm .029$; between weight index and I.Q., $.25 \pm .028$; and between anatomic index and I.Q., $.09 \pm .03$ (computed from fivefold tables).

In a cumulative study Bayley (509) reported correlations between intelligence and a comprehensive series of physical variables (weight, height, head circumference, cephalic index, body build, ossification index, age of cutting first tooth, illness record, and physician's ratings of physical condition). All coefficients were close to zero. From forty-five to sixty-one cases were utilized, at various ages from infancy to five years.

Carter (524) advocated the use of factor analysis, as a means of isolating variables which may be of greater importance than those at present used in the study of physical-mental relationships:

Correlations in the neighborhood of .20 have been found repeatedly. These are not valuable for predictive work. However, it should be remembered that they are correlations between composites, naively put together, or naively accepted because found together in nature. On the side of the physical data, such measures as height and weight are very complex composites; even such measures as length of forearm are composites, since the length of one bone may be a resultant of the interplay of numerous forces. . . . Factor analysis may be expected to yield purified, uncorrelated factors, which will behave in a less routine, less monotonous, and more significant

way than do overlapping variables. At present we have many measures, all so imbricated that they are all largely measures of the same thing (gross size). To the extent that the measures are correlated, defense of the present system amounts to insistence that only one thing in anthropometry is worth measuring, and that even this one thing is not worth measuring well. It is as if an engineer recording elevations always added the distance of a planet to each measurement, thereby minimizing all important differences on earth.

Only time will tell whether these statistically distilled and purified physical factors will yield a closer relationship to purified mental factors than is obtained in the variables at present investigated. Sanders (435) also reviewed the relationship of intelligence to height and weight.

Head Measurements

Earlier studies of head measurements failed to yield significant relationships with intelligence, whether a single dimension was used, or a "module" or average of several regarded as representative of head size. But the hypothesis might be advanced that intelligence is more likely to be a function of brain cubic capacity, than of linear measurements taken alone or crudely averaged. Broom (518) employed a formula devised to give brain capacity, when the length, breadth, and height of the cranium are entered in relation to certain constants (Lee formula No. 14). Among 100 college men a correlation of only .12 was found between this volume measure and Thorndike score (Intelligence Examination for High School Graduates). Among 100 college women the correlation was .24. It is apparent that this refinement of technic has no significant effect upon the correlations ordinarily obtained between anthropometric and intellectual measurements. Even this low correlation is subject to revision downward if the groups studied contain a heterogeneous racial mixture. It is not unlikely, for example, that in a mixed group containing persons of North and of South European origin, a small positive correlation would occur between head measurements and intelligence, although tending to disappear if computed for the two subgroups separately. In a homogeneous Japanese group, Okada (590) found a small difference in head circumference, when children of superior and inferior scholarships were compared, indicating a low positive relationship between these variables. Among the feeble-minded, closer relationships may sometimes be found between head size and intelligence because of the presence of cases of cerebral hypoplasia (microcephaly).

Body Build

A careful study by Klineberg, Asch, and Bloch (565) involved a selection of 153 college men homogeneous as to age, education, and socioeconomic background. On the basis of a battery of anthropometric measurements, the sample was separated into a stocky or "pyknic" and a linear or "leptosome" group, intergrading cases being eliminated. A series of information, memory, perceptual, and personality tests was administered,

but no reliable differences could be shown between the two groups. Similarly negative results were reported by the same investigators as to the relationship of body build to scholastic aptitude and other psychological traits among students in a women's college. In a recent study, Liefmann (208) found no relationship between body build, classified in terms of Kretschmer's types, and a series of motor abilities. Cameron and Pryor (522) used a case study method in dealing with the effects of extreme deviation in body build. Depending on circumstances, these deviations may operate either as social assets or as liabilities leading to social and emotional maladjustment. Indirect effects upon scholarship and intellectual "drive" can be inferred in individual cases. Theories concerning body build and psychological traits have been recapitulated by Landau (568).

Anatomical and Physiological Age: Pubescence

Little has been added to our former knowledge of relationships in this field. Stone and Barker (622), studying the relation of age at menarche to intelligence, in 594 college women, found a correlation of $-.175 \pm .036$ in one group and of $-.042 \pm .042$ in another. Menarcheal age also showed a low relationship to personality traits as measured by the Bernreuter test. A possible attenuating factor is unreliability in the measurement of age at menarche, depending upon memory of persons who at the time of the study had a mean age of eighteen years. Care was taken to keep the groups as homogeneous as possible, by eliminating students of Oriental, Semitic, or South European derivation. The results were similar to those of Brooks (517), who in an earlier study of freshman women reported correlations ranging from $-.04$ to $-.139$ between age at menarche and intelligence as measured by an eight-hour examination.

Body Chemistry: Endocrine Factors

The association of subthyroid conditions with mental defect (cretinism, myxedema) has led to an interest in studying relationships between thyroid function and mental performance within a normal range of subjects. The convenient index of thyroid function is basal metabolic rate (BMR). It must be pointed out that as ordinarily administered this is unsatisfactory as to reliability and that thyroid functioning is only one of the factors determining basal metabolism. In a group of fifty-two college women, Patrick and Rowles (593) found correlations of around zero between intelligence and BMR, blood pressure, and vital capacity. The authors seemed disappointed by these low relationships and suggested that a closer association could be demonstrated if the study were conducted over a wider age range. Such a study has been made by Rothbart (610) (not, however, with the use of repeated measures). Rothbart (610), after summarizing recent studies on psychological factors in relation to basal metabolism, reported results for a group of fifty-nine boys and thirty-nine girls in a state institution, ranging in age from nine to fifteen years, and in I.Q. from 60 to

120. No definite relation was found between I.Q. and BMR. It was also shown that between subjects of normal and of subnormal mentality there was no difference in blood cholesterol.

From a group of clinic children Levy (574) selected for basal metabolism determinations those who showed some indications of glandular imbalance. The correlation between I.Q. and BMR was, again, close to zero, and remained so when the relationship was studied for subgroups (non-problem cases, cases with I.Q. below 75, and cases with I.Q. above 110). Although in general no relation was found between BMR and behavior deviations, there was some slight indication that children with scholastic difficulties tended, in an unexpected proportion of cases, to have BMR's of -11 or lower. Levy concluded with an interrogation rather than with a declarative statement: "It has always been recognized that there is a group of cases in which scholarship difficulty is not due to lack of intelligence. Is it due to lack of interest? Does that lack of interest come from lack of drive as measured by basal metabolic rate?"

Studies of the psychological effects of glandular therapy have usually dealt with too few cases, and have presented the results in such form (599) that definite conclusions could not safely be drawn. An investigation by Marinus and Kimball (581) overcomes the former but retains the latter defect. Children in special classes in Detroit were examined for cases of suspected endocrine dysfunction; 233 of these were given glandular treatment and 151 reserved as controls; the procedure in matching controls was not stated. Results were given in terms of the percent showing increasing I.Q. percent with no change, and percent with decreasing I.Q. The data appear to indicate that the experimental group, as compared with the controls, showed a smaller percent making gains, but also a smaller percent suffering losses. Tests of achievement gave similarly uncertain results. Tests of motor function showed no significant trend. If any conclusion at all can be drawn from this material, it is that from the psychological standpoint treatment is advantageous for the congenitally hypothyroid, of no value for the pituitary deficient, and of uncertain value for other hypothyroid and for mixed cases. The writers stated: "Faulty thyroid function in pregnant women interferes with normal development of the central nervous system to a degree dependent on the severity of thyroid deficiency at different stages in the development of the fetus. Later thyroid feeding may enable the nervous system to function more efficiently, but without repairing damage already done." It seems desirable, however, to reserve judgment on this study until the data are reported in more adequate quantitative form.

Other clinical studies, not reported in the previous review, include the following: Konikow (567) reported scholastic improvement as the result of organo-therapy, in a case of gigantism. Geiger (548), in twenty cases, found indications of better school adjustment and of more consistent mental performance, as the result of pituitary extract administered hypodermically or thyroid extract administered orally, or a combination of the two.

Bronstein and Brown (516) treated twenty-one cases of hypothyroidism in children from one to sixteen years of age. They concluded that therapy tends to lessen the characteristic lethargy and unresponsiveness of the cretin, but that ability as indicated by tests remains substantially the same. Even when repeated tests were given over a period of two or more years, cases of I.Q. increase were no more common than cases of I.Q. decrease. Evidence is lacking as to the mental age level which the congenitally hypothyroid can attain under treatment. Gordan (552) believes that some cases can be brought to approximate normality. Kimball and Marinus (563) considered that the normal limit for untreated cretins is six years mental age and that under treatment instituted in infancy this may be increased to eight years. The importance of early treatment lies in the possibility of promoting, to some extent, differentiation during the period of the most rapid development of neural structures. Mental retardation is less marked and is perhaps more amenable to treatment, in cases of children of normal birth who develop hypothyroidism later in life.

The effects of pituitary disorders were investigated by Menninger (584). The majority of cases of pre-adolescent hypopituitarism were said to present evidence of mental retardation. Diabetic children, on the other hand, were described by Sherrill (615) as "mentally precocious." Insulin treatment permits normal growth in height and weight; the effects upon mental characteristics are not indicated.

A striking case of discrepancy in physical and mental growth was reported by McClure and Goldberg (578). At the age of five years and seven months a boy diagnosed as suffering from a pineal tumor showed: a mental age slightly below his chronological age; dentition normal for his chronological age; markedly advanced sexual development; and skeletal age, as determined from X-rays, equal to that of a boy of sixteen or eighteen years. This indicates a degree of specificity in development in conformity with what has previously been reported in the summaries on puberty precox (560:158).

In a large sample of Finnish children, Vuori (626) investigated the relationships of blood grouping to marks obtained in school. The distributions of grades were substantially the same for members of the different blood groups.

Studies of differential chemistry of emotional states and of neuroses and psychoses were fully reviewed by Dunbar (533). Relationships to mental ability are not at all clear and lack any systematic organization in relation to theory. Rich (605) reported a correlation of $-.51$ between intelligence and urinary excretion of phosphorus per unit of body weight. This was based on only twenty-eight subjects, and in a subsequent study with more cases Rich (606) found correlations of close to zero between intelligence and inorganic phosphorus in blood plasma, lipoid P, and total P. The correlation with blood calcium was also approximately zero. Powers (600), comparing twelve normal or superior persons with twenty idiots, reported that the latter were normal in calcium but high in in-

organic phosphorus—supporting Rich's original finding. The present review will not attempt to consider studies of drug effects or applications of colloid chemistry in connection with problems of psychophysiology.

Relevant, however, to this field of inquiry is the study of variations in psychological functions in relation to the female sex rhythm. Herren (556), in a recent study, found premenstrual changes in cutaneous sensitivity to touch and pain and attempted to explain his results in terms of the influence of the female sex hormone upon the central nervous system. Other investigators have reported, in relation to the menses, changes in visual functions, neuromotor excitability, muscle strength, and motor coordination. A number of these effects appear to be well established on the basis of careful measurement, but the results are not at all clear as regards more complex mental functions and mental efficiency. This is a significant field for further work, not only because of its immediate practical importance, but also because of its bearing upon the theory of physical-mental relationships. A competent review of the literature up to 1934 was published by Seward (614).

Diurnal variations in performance have also been studied, in relation to changes in respiration, body temperature, metabolism, acid-base balance of the blood, etc. It would take us too far afield to deal with these in detail. The present state of the literature on diurnal variations is indicated in a review by G. L. Freeman and Hovland (543), who found twelve studies reporting a continuous rise in mental performance in the course of the day, twelve studies reporting a continuous fall, five reporting a morning rise and afternoon fall, and five reporting a morning fall and afternoon rise. Specific environmental factors are evidently of predominating importance, and evidence is lacking for a "natural rhythm" or a typical diurnal curve of performance.

Disease and Physical Handicap

Simpson (617) reported on behavior changes in tuberculous children, finding a high incidence of retardation and many indications of central nervous system involvement. Only forty cases were studied, and it is not clear that the possible influence of associated variables was excluded.

Richey (274) conducted a study on the effects of diseased tonsils and adenoids in which 104 school children received a tonsillectomy or adenectomy, 100 were classified as "needing attention," and 200 with normal tonsils or adenoids were paired, as controls, with members of the preceding groups. All received intelligence tests; in the case of the operated group six months were allowed, after the operation, before retesting. As in the studies by Rogers and Lowe, reported in the previous review, it could not be established that the removal of focal infections had on the average any beneficial effect upon intelligence, nor that the presence of infections produced a statistically significant impairment of mental ability. In an earlier study by Angell (505) the removal of tonsils or adenoids was indicated as having no effect upon intelligence (teachers' ratings were

used rather than intelligence tests). In school work, however, improvement was registered in 48 percent of the cases. The sample studied is larger than in any other investigation in this field, but the methods of measurement and of statistical analysis are far from satisfactory.

Considerable attention has been given to the effects of intracranial birth lesions (596). Doll (529, 530, 531) pointed out that except for heredity, birth injury is the largest single etiological factor in mental deficiency. In a given case the growth of intelligence may or may not be disturbed; injuries to motor functions and interferences with normal development of the personality are common. Birth injury may affect intelligence primarily, without motor symptoms; where motor symptoms also occur, these may diminish in the course of growth, without necessary improvement in intellectual functions. Spastic cases tend to show more mental impairment than athetoids, probably because of the locus of the lesions involved (cortical pyramidal cells in the former case, basal nuclei in the latter). The picture derived from these observations is of a common factor which may influence one or several aspects of development, without implication of a direct interrelationship between the functions affected.

Draper and Johnson (532) discussed the role of enteric disease in producing emotional instability and mental retardation. Their point of view is indicated by the statement, "We have found that children or adolescents who begin to show abnormal alterations in personality are always physically sick." Improvement was reported in psychological traits following operation, but the data are not in statistical form.

A curious result has been reported by Balyeat (507, 508) in two studies of 120 allergic children. These were found to have higher I.Q.'s than a comparison group of non-allergic children, the difference being attributed to "greater activity of brain cells in children subject to allergy." The results are not in conformity with those more recently reported by Sullivan and Gahagan (623) who found among forty-five allergy cases in a children's hospital an I.Q. distribution similar to that of an unselected school population. The question should be raised as to whether the children referred to Balyeat may not have represented a superior school selection.

The relation of congenital syphilis to mental retardation is well known. Kiss and Rajka (564), using a Hungarian version of the Binet-Simon tests, reported an incidence of mental defect of 38 percent among syphilitic children. The incidence was reduced to 9 percent, however, among children who had received treatment beginning prior to the end of the second year. W. Lange (571) reported on the results of Binet-Simon-Obertag tests administered to children who had been victims of epidemic encephalitis. The psychological effects of the disease were found to be most marked in children who contracted it under the age of five years. Subsequent testing indicated a tendency toward progressively diminishing I.Q.

Studies of epileptic children agree in finding subnormal average I.Q.'s. For different groups, average I.Q.'s ranging from 65 to 80 have been re-

ported by Fetterman and Barnes (538); Fox, and Dawson and Conn (reviewed in 623). The proportion of feeble-minded among epileptics ranges from 6.5 percent (Paskind (591) reporting on cases in a private practice) to over 80 percent in some institutional samplings. In the most recent investigation in this field, a study of 103 clinic cases, Sullivan and Gahagan (623) reported a median I.Q. of 92; 18 percent received I.Q.'s at the moron level or below, but the marked variability of the group was shown by the substantial number of cases of superior intelligence. There appears to be a tendency for cases of primary or idiopathic epilepsy to rate higher in I.Q. than cases in which there is a definite organic diagnosis. I.Q.'s are also higher among those whose record shows the age of onset to have been subsequent to six years; this is in conformity with data concerning other disorders with central nervous system involvement. Deterioration with diminishing I.Q.'s has been reported by some writers, but this is by no means a universal finding (594). Retests frequently show wide fluctuations, both up and down. It may be suspected that this should be interpreted partly in terms of unreliability of measurement of epileptics who are tested too close to the time of a seizure.

A most exhaustive study on premature children was recently reported by Hess, Mohr, and Bartelme (38). In confirmation of previous results, it is apparent that the abnormal early environment and early physical condition of the premature have no necessary handicapping effect upon later mental development. Inman-Kane (40), however, found that premature birth and underweight at birth are more common among cases of mental deficiency than in the general population, and that in a group of school children born prematurely the incidence of mental defect is higher than expected. This association is considered to depend largely upon birth injury; if cerebral lesions have not occurred at birth the prognosis for later development may be satisfactory.

Troili (625) studied the effects upon the behavior of physically subnormal children of a régime in an open air school. Reviewing an earlier study by Fantini and Ciampi which had indicated gains in intelligence obtained through similar procedures, he recorded behavior changes in 118 third-grade children in the course of a school year. His conclusions are not well supported, since no control group was utilized.

Studies of special groups of handicapped children indicate, for the most part, a lower average intelligence than in the case of unselected children. Winkler (628) found crippled children retarded in intelligence as compared with the general school population. Witty and Smith (629) reported a mean I.Q. of 85 for 1,480 crippled children. Lee (573) obtained a mean I.Q. of 87, slightly higher for the poliomyelitis group, and markedly lower for the group with spastic birth paralysis. Nilson (255) compared 169 "disabled" children with 2,590 unselected children in the Minnesota public schools. The former had 15 percent below 80 I.Q., only 5 percent above 120 I.Q. The latter had 4 percent below 80 I.Q., 16 percent above 120. The Kuhlman-Anderson group intelligence test was used, but

the comparison is somewhat vitiated by the fact that the disabled children cover a much wider age range, and the comparability of I.Q.'s is open to question in the upper ages.

Numerous studies have compared deaf and hearing children, with results which usually indicate some degree of mental retardation for the deaf. These investigations were summarized by Pintner (598) up to 1930. Madden (579), Waldman, Wade, and Aretz (627), Shirley and Goodenough (616), and MacKane (219) contributed further reports on this subject.

Other studies have indicated I.Q.'s lower than average for blind children (512), left-handed children (535, 539), and other special groups. These do not require detailed examination here; as in the case of the majority of studies in this section, they represent primarily not a functional inter-relationship between mental abilities and physical traits, but the diverse operation of a common pathological factor. For related studies on the influence of disease upon motor development, see a recent review by Abramson (335).

Different in conception from any of the preceding studies is an investigation by Maller (224, 580) based on over 100,000 cases. These were fifth-grade children in 579 schools in New York City. The correlation between average I.Q. (N. I. T. and Pintner Survey Test) and the percent in each school having a given defect was as follows: visual defect, $-.40$; teeth defect, $-.50$; defective tonsils, $-.26$; malnutrition, $-.28$. These coefficients are considerably higher than correlations ordinarily reported because they represent averages from large samplings. Between average I.Q. and economic status of the neighborhood (based on value of home rentals) a positive correlation of $.50$ was found, and between average I.Q. and health, with economic status constant, a correlation of $.28$. This latter cannot be interpreted exclusively in terms of the influence of health on I.Q.; the inference should rather be made that in holding constant one measure of economic status, we have failed to account for all of the factors common to social, hygienic, and intellectual superiority.

The effect of physical factors upon intelligence quotients is suggested by Pintner and Forlano (271) in their study of 17,502 I.Q.'s classified by social level and by month of birth. In each social level the lowest average I.Q. occurs among children born in the winter months (January to March). The I.Q. difference between these months and the highest seasonal mean is small but statistically reliable. When the months are ranked as to average I.Q., sunshine, and temperature, correlations of $.59$ are found between I.Q. and amount of sunshine, and of $.67$ between I.Q. and temperature. These high values should not be misinterpreted; as in the case of Maller's study, they are, of course, correlations between means. Pintner and Forlano drew the inference that "children born in winter suffer more illness and are born of mothers weighted with more illness," with consequent effects upon mental development. It may be noted, however, that the social classification represents a coarse grouping into three categories, with considerable heterogeneity in each group; an alternative explanation

might be offered in terms of differential birth control (children born in the summer are those who have survived a winter pregnancy). In a climate involving extreme seasonal variations in sunshine and temperature, Schiötz and Seland (612) found no relationship between month of birth and height or weight (1,952 Norwegian children). In a subsequent study of eminent men, Pintner and Forlano (271) found no relation of eminence to birth month. Reports on German children by K. Lange (570), and on American children by Palmer (426) agreed in indicating seasonal fluctuations, with maximum rate of growth in the fall. Palmer, however, disagreed with Emerson's inference (536) that seasonal fluctuations in growth are related to the incidence of illness.

Physical Abilities

The trend toward measurement has resulted in the development of standardized tests for "physical efficiency." These are concerned with such functions as strength, exercise tolerance, vital capacity, and the gross motor functions of jumping, running, dodging, throwing, etc. Correlational studies by Landis, Burt, and Nichols (569), Cozens (527), and others indicated no relationship to intelligence among college students. Heaton (555), on the other hand, found that among school children "the average general level of physical development of the children who rate high on intelligence tests is distinctly superior to that of the children who rate low on intelligence tests." Tests included in these batteries are, more than most tests, subject to practice. If children of superior social status have more incentive or opportunity to practice certain athletic skills, this may result in a spurious correlation between tests of intelligence and tests of physical abilities. Subsequent work should attempt a control of the factor of social status. In a relatively homogeneous senior high-school group, McCloy (577) found slight negative correlations for both boys and girls between I.Q. and a series of tests of strength, posture, the Brace test, the Sargent jump test, etc. Such a relationship would perhaps be expected in a grade selection if, as is commonly the case, the brighter pupils are younger and smaller. Among 155 junior high-school boys, Ragsdale and Breckenfeld (601) reported a small negative relationship between I.Q. and speed in track events, a small positive relationship with accuracy and strength. Moore (586) found substandard athletic ability and inferior intelligence in a group of 150 problem boys. This may not indicate any general association between the variables considered, but merely the fact that in a sample selected as problem cases, inferiorities are likely to appear in a variety of traits. The relationship between athletic ability and scholarship was discussed by Davis and Cooper (528), who summarized results from over forty studies in colleges and secondary schools. Superior average scholarship is reported for non-athletes in eighteen studies, for athletes in fifteen studies. These varying results evidently depend upon local circumstances as to selection, admission standards, scholarship standards, and

other factors irrelevant to our present interest. We are safe in concluding that on the basis of the total body of evidence available, the relationship between intelligence and gross motor functions is close to zero in any fairly homogeneous school population.

Physical Traits in Relation to Scholarship

Studies among college students by Chapin (525), Gittings (549), and Harris (554) indicated that physical traits are in general no more closely related to scholarship than to intelligence. One of the highest correlations reported is that by Chapin: .21 between academic grades and a measure of physical condition, for 250 women students. In a fairly homogeneous college group of foreign-born Jewish parentage, Harris selected subgroups consisting of those having numerous respiratory infections, those with a history of severe illness, those with poor physical development, and those below 63 inches in height. Each subgroup, containing from thirty-eight to eighty-one cases, showed scholarship grades and intelligence scores close to the average for the total class. F. S. Freeman (542) investigated forty-two cases in which there was a marked discrepancy between scholarship and intelligence. In only one of these was the scholarship deficiency attributed to illness.

Ohmann (589) conducted a study at the University of Iowa, making use not merely of quantitative measurements but also of a diagnostic interview. In 128 cases of scholastic defect, an attempt was made to determine causative factors. Physical factors were listed as of comparatively small importance, each of the following taking precedence: motivation, intelligence, emotional adjustment, educational preparation, study habits, environmental factors. A similar study by Remmers (604) at Purdue came to somewhat similar conclusions. In the smaller number of cases of scholastic deficiency attributed to lack of physical fitness, apparently visual defect was the major difficulty present. Nelson (588) reported a significant effect of visual correction upon scholarship in the case of ametropes. He pointed out, however, that for the total range of students there is no point in correlating visual efficiency with scholarship, since many students with good eyes are inferior students and many with poor eyes are particularly good students.

In the case of school children, positive results are somewhat more frequently reported. Beggs (510) found that children retarded in school three or more years have an excessive number of physical defects. His criterion for retardation was so severe as to result in the inclusion of many feeble-minded in the retarded group. Liefmann (208), on the basis of a study of ten-year-old girls in Freiburg, concluded that "the healthier child is generally the abler one." Of thirty-three mentally superior children, eighteen were in the first and second groups in terms of physical condition; none was in the lowest group. Of thirty-three mentally inferior children, only three were in the first and second physical groups and five in

the lowest group. The conclusion should have support from data presented in less cumbersome fashion. In a further study by Liefmann (575), children who were school repeaters were found to be inferior in physical measurements and physical condition and to show more cases with indications of rickets or of tubercular tendency. Liefmann (576) also noted that repeaters tended to be more inferior to the normal in chest measurements (including expansion and lung capacity) than in height and weight measurements.

These results are not supported by Blonsky (513), but Paull (595), in a study of over 10,000 normals and 1,446 repeaters in the schools of Karlsruhe, found that the latter were inferior in physical size at each age (six to fifteen) and in each sex. The interpretation emphasized genetic association rather than the influence of environmental factors. Rosell (608) made a study of skin capillaries, according to the methods of Jaensch, in relation to school status. Of sixty-one subnormal pupils (Hilf-schülerinnen) 72 percent were classified as having "poor" capillaries, as compared with 33 percent in a normal sample. Müller (587) reported an unusually high correlation of .70 between school performance and social status, and .60 between school performance and family income, among pre-adolescent girls. Health was considered to be an important factor, but the data do not permit evaluating this factor independently. A number of German studies (520, 521, 557) investigated the effects of family unemployment upon the school performance of children. At all ages decrements found in achievement tests or in scholarship grades were attributed to the unemployment status of the father. Girls were said to show injurious effects to a more marked degree than boys, younger children more than older children. The latter effect was masked somewhat by the fact that disturbance to scholarship was cumulative, increasing with longer terms of unemployment. Busemann inferred that these effects are mediated primarily through poorer hygienic conditions and their influence upon child health and resistance to fatigue. Although large numbers of cases are dealt with, the differences considered are not in all cases statistically reliable. It is interesting to note that according to Fürst (547) children in Jena are considerably taller than corresponding age groups before the war, the difference averaging 8.9 cm. for the boys and 11.6 cm. for the girls. This is attributed to environmental effects. It is unfortunate that comparable data from psychological measurements are not available.

Keal (562) made a study of 109 boys entering Detroit High School, following them through four years and analyzing reasons for dropping school and for poor scholarship in cases with adequate intelligence. Results from physical examinations and from corrective work led to the conclusion that "health is the greatest single factor governing success in school." The study suffers from a lack of a sufficient number of cases to establish the thesis; there is no clear division of the sample into a group having corrective work and a control group, and the statistical treatment is of an elementary character. The study deserves attention, however, be-

cause it is one of the few in which children have been followed over a span of years and consecutive observations attempted.

Richard (607) studied the relation of scholastic overwork to physical disturbances. On the basis of clinical experience, he listed the symptomatology of overwork as: retardation in weight and height, shallow and insufficient respiration, rapid and unstable cardiac rhythm, constipation, nutritional and motor disturbances. This is apparently a one-sided view of the problem. From the reverse standpoint of Adler's individual psychology, it would be appropriate to consider overwork as a part of the symptomatology of physical inferiority. To support Richard's thesis more detailed quantitative data are necessary; how much "overwork," in what children, produces what specific symptoms, and through what time relations? Seham (613) studied chronic fatigue in the school child, finding evidence that "subefficient" children are inferior in anatomical measures, are less steady in motor tests, and have poorer health habits. Again, it is apparent that we are dealing with complex phenomena which cannot be explained in terms of a single causation.

Stedman (620) found a relationship between physical condition, I.Q., and scholarship among high-school pupils in Los Angeles. The results are sufficiently positive to justify presentation in some detail:

Physical condition	Number	Grade points	I.Q.
"Healthy"	39	11.4	104.0
Defective tonsils or adenoids.	128	9.5	102.0
Eye defects	91	8.9	101.5
Defective teeth	136	8.3	100.0
Heart defects	70	8.9	99.5
Lung defects	13	7.3	98.0

The scholarship differences were said to remain when comparisons were made for children in different health groups but of the same I.Q. The subsamples, however, were too small to yield reliable differences. Stedman feels that she has presented evidence as to the effect of health upon intelligence and school grades, and comments on the futility of pouring money into education and at the same time "failing to furnish medical and dental care that would make education effective." It is not clear, however, whether her material shows an actual influence of health factors or whether the apparent relation is attributable to some common factor such as socioeconomic status.

A similar explanation may apply to Woehlert's findings (630) for a group of 500 children in a suburban school in Berlin. Woehlert compared the top 10 percent for scholarship with the lowest 10 percent, discovering an average difference in physical traits equivalent to about half a year of growth.

Evidence from Mental Defect

It is unnecessary to review here the very numerous studies which have convincingly indicated that feeble-minded children tend on the average

to be shorter and lighter than normal (550), to show anomalies in dentition (502, 526), to have lower basal metabolism (515), and to be marked by stigmata in numerous structural characteristics (559:1062). In interpreting this enormous mass of material, we should bear in mind several points: (a) In a study of the lowest 2 percent of the population, relationships may emerge which are too slight to be detectable in the middle ranges of intelligence; (b) if we eliminate cases of secondary feeble-mindedness, constituting perhaps one-third of the total group, physical-mental relationships will be greatly reduced (these are cases in which a common pathological factor has affected both mental development, as dependent on the cerebral cortex, and some one or several aspects of physical growth or motor function); and (c) Duncan (534) reported physical measurements for a group of high-grade mental defectives, ages nine to sixteen years, under superior care. Of these, 95 percent were above weight for their height and the majority were above standard for both height and weight. The inference may be drawn that the commonly found physical inferiority of the feeble-minded is to some extent attributable to inferior nutrition and to substandard health habits.

Evidence from Sex Differences

The extensive literature on sex differences in mental characteristics may be utilized in connection with the problem of physical-mental relationships. Sex differences which are an outcome of differences in training and in the social environment of the two sexes would not be relevant for the present purpose; but differences which can be definitely attributed to a biological basis would be useful at least for pointing the way to further fundamental studies. A difficulty here is that the cause of sex differences is usually conjectured rather than known. Of more value than most is a report by Book (514) dealing with differences between a group of 475 college men and an equal number of college women, on a series of tests adapted from the Army Beta. In two tests the women excelled and in two the men were definitely superior. That these results are not due to differences in training during the period of school life is indicated by the fact that similar differences were found by Snoddy and Hyde (619) in their application of the same tests to elementary-school children. Book's interpretation assumes physiological sex differences due to unspecified metabolic or endocrine factors, resulting in a higher frequency in the transmission of neural impulses in women and shorter refractory periods; as a result women excel in activities where stimuli are constantly changing and where quick perceptual adaptation is required. Men have longer refractory periods and therefore fewer impulses per unit of time; their reactions are slower, more massive and deliberative, and they excel in tests requiring a more sustained analytic or integrative attitude. In general or composite functions, sex differences tend to be cancelled out. Interesting as these suggestions are, at the psychological level they appear to rest on

results from too narrow a variety of tests, and at the physiological level they are far from empirical verification. Rosanoff and others (280) argued that a sex difference exists in intelligence, slightly favoring the female sex, and concluded that the major portion of this difference is due to the greater vulnerability of male fetuses to cerebral injury. Since in all mental characteristics the range within a sex is much greater than the difference between male-female averages, any study of causative factors in sex differences should aim towards an experimental phase in which the primary concern is with individual differences. For reviews of recent research on sex differences see Goodenough (551) and Allen (499, 500, 501).

Evidence from Growth Studies

In discussing the study of physical and mental relationships through the comparison of growth curves, F. N. Freeman (541) pointed out that the relative independence of physical and mental growth is shown by the following facts: mental growth curves for boys and girls are closely similar, but physical growth curves show conspicuous differences; negative acceleration is more marked in physical than in mental growth curves during adolescence, and intellectual growth continues after physical growth ceases; and finally, little relation has yet been found between periods of acceleration in mental and physical growth. These arguments are based upon the analysis of growth curves derived from population averages. Freeman recognized the possibility of more significant relationships emerging from the study of associated fluctuations in the growth curves of individuals. Moreover, both in individual and in average curves, fluctuations may be associated without being concomitant, since a common factor or group of factors may influence different functions with varying time lags. It is difficult, however, to point to actual results in this field. Bayley (509) analyzed mental and physical growth curves of children studied from birth to five years of age; individual cases show (a) concomitance of change, (b) correlated change after a time interval, and (c) complete lack of relationship. Honzik (558) studied data from mental tests and physical examinations given to 250 California children at twenty-one, thirty-six, forty-eight, and sixty months of age. Correlations close to zero were obtained between changes in mental test scores and changes in developmental status and physiological condition (as rated by the physician). There was, however, a tendency for children making an above-average gain in intelligence to make an associated above-average gain in height or weight (correlations for gains between twenty-one and sixty months were .17 for height and .13 for weight). These coefficients are more significant than cross-sectional correlations, since they are subject to greater correction for attenuation (436). An apparent rise in mental scores, relative to the group, was noted as occurring in the period of convalescence after a severe illness. A fuller discussion of this case study material will appear in subsequent reports.

Driscoll (24) conducted an interesting developmental study of fifty children in a nursery school follow-up. The prognostic value of various indexes was considered: mental test scores, special ability measures, physical measures in terms of deviation from Woodbury norms, and appraisals of personality adjustment. A "combined view" of these measures was attempted in the analysis of the case study material, preschool records being compared with records obtained during the school period. It is not clear that the combination of indexes, as proposed by Driscoll, was actually accomplished; i.e., while the various indexes for each child were made available for inspection, no method was suggested for integrating them in order to deal in a quantitative manner with problems of prognosis as involving interrelationships. Physical measures, as might be expected, were found to be of little or no value in predicting mental development; height in relation to age showed increasing age variability, but physical deviations were not associated with mental changes relative to the group.

Evidence from Studies of Later Maturity

A number of studies (566, 611) have made clear the essential facts concerning the decline, after maturity, of sensory acuity, reaction time, resistance to specific diseases, vital capacity, etc. Recent investigations by Jones, Miles, and their associates led to similar results concerning decline in complex mental functions. There is good evidence that the decrement in mental test abilities is not attributable to any large degree to losses of motivation, or to factors associated with the length of time individuals have been out of school. When samplings are kept uniform by comparing parents and children (in a rural group), Jones and Conrad (189) showed that at the age of fifty-five parents have dropped in intelligence test scores to about the test level of their fourteen-year-old children. If subtests particularly subject to the effect of length of experience are eliminated (general information, vocabulary) the recession is to about the thirteen-year-old level. Even apart from the more evident forms of senile pathology, it may be expected that in later life the correlations between physical and mental fitness will be higher than among children. Although it is probable that bodily changes play a highly important role in the age decrease in mental ability, at present we have little insight as to the physiological processes involved.

Relationships with Other Mental Traits

Continued work has been carried on at various centers on the relationship of physical factors to interests and attitudes. Earlier studies reporting conspicuous changes at puberty in play interests, vocational interests, social activities, etc., have commonly failed to take adequate account of the chronological age factor, and of the changing cultural patterns to which children become exposed at advancing ages. In subsequent reports by Furfey and his associates, an attempt was made to correlate various physical

measures with an index of social and emotional maturity which Furfey termed "developmental age." This has been done (a) with chronological age partialled out, and (b) with chronological age restricted to a narrow range. Among pre-adolescents correlations tend to be zero or negative, but at the age of fourteen or fifteen increasing degrees of relationship are indicated. Thus, in the fourth grade Zalduondo (631) reported a correlation of $-.58$ between weight and developmental age; in the fifth grade the correlation became $.00$; in the seventh and eighth grades it was $.36$. Between physiological age (as determined from Crampton's norms) and developmental age, Rauth and Furfey (602) found bi-serial r 's of $-.16$ at thirteen years, $.42$ at fourteen years, and $.79$ at fifteen years. As in the case of Zalduondo's study, the populations were small. For a series of five anthropometric measurements, Rauth and Furfey (603) compared correlations in pre-adolescent and in adolescent groups of boys of the same ages. Among the pre-adolescents, r 's ranged from $-.13$ to $.21$; among adolescents from $.22$ to $.60$ (age constant). An exception to these findings is a correlation of $.29$, age constant, reported by Carey (523) for a group of 174 boys, ages eight to thirteen years.

Furfey (546), in reviewing these studies, concluded: "From these various lines of evidence it seems fair to conclude that puberty does cause an increase in DQ. Of course this is what one would expect. It is frequently asserted in the literature that the adolescent acquires, along with his physical maturity, a new maturity of behavior. The present data appear to give an interesting quantitative confirmation of this opinion."

It would be rash, however, to infer that this is wholly or even largely a direct physical effect. The effects are in an important way mediated through changes in the social environment; as he becomes larger, stronger, deeper voiced, the boy attains status in new social groups and is led to conform to stereotypes judged appropriate for his degree of maturity. Relevant to this point, is the finding of a correlation of $.41$ (corrected for attenuation) in the developmental ages of chums with each other, and Merwick's report (585) of a correlation of $.186$, for 800 boys, between developmental age and socio-economic status as measured by the Sims scale. The direct influence of social factors is also suggested by Merwick's finding that rural children have a lower average developmental age than urban children, and institutional children a lower developmental age than non-institutional children. Here we may assume that in restricted social groups physiological maturing is slower in its effect upon social relationships. The differences found by Merwick are consistent in three age groups, but data from more cases are desirable to establish statistical reliability.

Supplementary to the above, studies should be made, by various methods, of physical factors in relation to other, perhaps more specific, groups of interests and attitudes (intellectual, athletic, competitive, etc.). Such investigations are needed not merely because of their intrinsic significance but also because of their help in the interpretation of studies of relationships between mental and physical factors.

Nutrition

Experimentation with animals has provided the basis for extraordinary advances in the science of nutrition. Experiments have dealt typically with the relation of nutrition to physical condition and physical growth, but increasing interest is being shown in behavioral relationships. Research with animals has the advantage of superior control over the experimental conditions, the disadvantage (particularly in the case of behavior experiments) of uncertain applicability to problems in human biology. This disadvantage is all the more marked, in view of the fact that there has been a tendency to limit experimentation to one species of animal (the white rat) and to test only a single aspect of the effect upon behavior (performance in mazes).

Anderson and Smith (503, 504) conducted an experiment in which normal growth was handicapped in two ways: in one group of rats, through a diet unbalanced as to protein; in another group, through a diet which was balanced but restricted in amount. As compared with a control group of animals on a normal diet, the stunted animals showed no inferiority in maze performance; in some respects they appeared to be actually superior, due perhaps to stronger motivation. Somewhat similar results were obtained by Frank (540), in a comparison of normal rats with rats stunted from rickets. Mixed findings were reported by T'ang, Ch'in, and Tsang (624), as to the effects of a restricted vegetarian diet; in the case of female rats no effect was demonstrated, but in the case of male rats learning ability showed an apparent reduction. Fritz (545) studied the maze performance of rats restricted as to vitamin B and as to the intake of certain salts, finding no effect on maze performance. The foregoing negative findings from investigations of adult rats are in contrast to the work of Maurer and Tsai (582, 583) with suckling rats which, until they were weaned, were drastically depleted of vitamin B. After weaning they were brought to normal weight, and in the subsequent test of maze learning care was taken to maintain motivation factors comparable for the depleted and for the normal group. The conclusion was reached that "normal rats are about twice as efficient as depleted animals" in maze learning, with the implication that early as depleted animals" in maze learning, with the implication that early vitamin B depletion produces permanently injurious effects upon the developing nervous system. Evidence supporting Maurer and Tsai has been given in a further study by Bernhardt (511).

This work led directly to a study of children by Balken and Maurer (506); the procedure in this case involved the study of possible favorable effects of vitamin B feeding among subjects who had presumably received inadequate diets in infancy. Children selected for the study (twenty-four boys and twenty-two girls) were from one of the poorest sections in Chicago and largely of foreign-born parents. A battery of intelligence and performance tests was given, before, during, and at the close of the experimental period. No average I.Q. gains were registered as the result of twenty weeks of vitamin B administration. Although improvement occurred in the per-

formance tests, it is quite possible that this was due wholly to practice and to normal maturation during the period of the experiment; there was no control group.

Other studies of children have failed to show positive results from experimental changes in nutrition. Rosenberg (609) compared I.Q. gains in two groups of underweight children, one of which received a representative complete dietary, while the other received cereal, fruits, nuts, vegetables, and one quart of milk a day, but without eggs or meat. After six months the average I.Q. of each group remained substantially the same. To check the possibility that gains in nutrition may be followed by a delayed gain in I.Q., it would have been desirable to repeat the tests six months later.

Smith and Field (618) compared an experimental group of twenty-five underweight children with children who were approximately normal according to the Baldwin-Wood tables. Health lessons, school lunches, and various motivational devices were employed with the underweight group. The effectiveness of this procedure was shown by the fact that in a six-month period they gained in weight 26 percent more than the normal expectancy. Again, however, intelligence scores failed to show any accompanying increments.

A study by Graper and Park (553) involved a selection of children who were undernourished, revealed low I.Q.'s, and came from homes of poor socio-economic status. Improved feeding was said to be associated with I.Q. gains, but unfortunately the number of cases was too small (eight children) for definite conclusions.

Beebe (98) conducted an experiment with ten preschool children on learning to maintain equilibrium on a balancing board. Graphic records were made of the subjects' performance in a series of practice tests and in a subsequent retention series. The investigator felt that there was evidence of a slight positive relationship to body nutrition, but because of the small number of subjects this could not be established in a clear-cut fashion. The hypothesis was advanced that "optimal neuro-muscular learning is associated with optimal nutrition as affecting chemical balance of muscle cells and circulating fluids."

M. C. Jones and Davis (561) made a detailed case study of ten markedly overweight girls of adolescent age, compared with ten girls of approximately normal weight and of the same ages. There were no differences in intelligence or in achievement test scores, but differences emerged in a number of specific social and emotional traits.

Browne (519) studied the relationship between nutrition and scholarship among 1,600 pupils in a senior high school. Divided into four groups on the basis of deviation from the Wood-Baldwin-Woodbury tables, there was no evidence that the children of poorer nutritional status had a poorer average scholarship. The writer assumes that a relationship occurs at lower grade levels, but that this is lost, in the course of promotion, as a result of the elimination of the physically and mentally unfit.

Undismayed by negative findings, investigators in this field exhibit a tendency to assume that positive results are just around the corner, and

will become visible if the experimental procedure is slightly changed. Common sense leads us to expect some direct or indirect influence of nutritional level upon mental performance; contrary evidence is accepted only very reluctantly. In view of this continuing faith, we may expect an increasing number of studies of the psychological effects of specifically restricted or extended diets. The future will undoubtedly bring closer cooperation between psychology, education, and the nutrition laboratory. Many nutrition investigations have been conducted which would be admirably adapted for the present purpose, if supplementary psychological measurements could have been made. The most promising field for present work appears to lie in studies beginning in infancy and employing homogeneous experimental and control groups; with experimental periods lasting for at least a year and with a program of physical and psychological measurements extending over several years. For a discussion of other related investigations, see a recent review by Fritz (544).

Emerson (537) offered the opinion that about 40 percent of children are malnourished and only about 20 percent in optimum condition. Although the experiments with animals involve an interference with normal nutrition of a more drastic character than is perhaps found within a normal range of developmental conditions in human infancy, such findings as those by Maurer and Tsai suggest the possible significance even of minor nutritional insufficiencies occurring at an early age. From a social standpoint, an agency which produces a small, perhaps unrecognized degree of retardation in a substantial number of individuals may be more important than one which produces an extreme degree of retardation limited to a fraction of 1 percent of the total population.

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Chapter III. Motor Development from Two Years to Maturity

(See also Nos. 90, 98, 118, 232, 235)

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HISTORY OF EDUCATION AND COMPARATIVE EDUCATION

Prepared by the Committee on History of Education and Comparative Education: I. L. Kandel, Stuart G. Noble, Edward H. Reisner, Herman G. Richey, and Newton Edwards, *Chairman*; with the cooperation of R. Freeman Butts, Erich Hylla, Alina M. Lindegren, and D. S. Woods.

TABLE OF CONTENTS

Chapter	Page
Introduction	355
I. History of Education in the United States and Canada	357
A. History of American Education during the Colonial Period ..	357
EDWARD H. REISNER, <i>Teachers College, Columbia University, New York, New York</i> , and R. FREEMAN BUTTS.	
B. History of American Education since the Beginning of the National Period	363
HERMAN G. RICHEY, <i>University of Chicago, Chicago, Illinois</i> .	
C. State Histories of Education	372
STUART G. NOBLE, <i>Tulane University, New Orleans, Louisiana</i> .	
D. History of Education in Canada	377
D. S. WOODS, <i>University of Manitoba, Winnipeg, Manitoba</i> .	
II. History of Education in Europe	383
A. History of Education in England	383
NEWTON EDWARDS, <i>University of Chicago, Chicago, Illinois</i> .	
B. History of Education in France	387
I. L. KANDEL, <i>Teachers College, Columbia University, New York, New York</i> .	
C. History of Education in Germany	389
ERICH HYLLA, <i>Teachers College, Columbia University, New York, New York</i> .	

Vol. VI No. 243 Miching

<i>Chapter</i>	<i>Page</i>
D. History of Education in Italy	394
I. L. KANDEL, <i>Teachers College, Columbia University, New York, New York.</i>	
E. History of Education in the Scandinavian Countries.	396
ALINA M. LINDEGREN, <i>United States Office of Education, Washington, D. C.</i>	
III. Comparative Education	400
I. L. KANDEL, <i>Teachers College, Columbia University, New York, New York.</i>	
Bibliography	417

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INTRODUCTION

IN PREPARING THIS NUMBER of the *Review of Educational Research* it was necessary to choose between a general survey of the literature, regardless of date of publication, and a critical evaluation of relatively recent publications. The former alternative seemed the wiser at this time, although it necessitated the omission of some items which it would have been desirable to include. This choice also made it impossible to present a summary of the literature of all the countries of the world.

It should be pointed out, perhaps, that it is particularly difficult to summarize briefly the results of investigations in the history of education or in comparative education. About all that can be done in a summary of this kind is to provide workers in the field with a series of critical essays on the most valuable writings in the fields covered.

Each member of the committee and each collaborator was entirely free to present his summary in the form which seemed best adapted to the subjectmatter being summarized. This procedure resulted in lack of uniformity in the style of presentation, but it is hoped that it has not detracted from the usefulness of the monograph.

NEWTON EDWARDS, *Chairman,*
Committee on History of Education
and Comparative Education.

CHAPTER I

History of Education in the United States and Canada

A. HISTORY OF AMERICAN EDUCATION DURING THE COLONIAL PERIOD

WHILE MANY IMPORTANT AREAS remain to be treated, the literature of historical research in Colonial education is substantial in amount and much of it excellent in quality. In our listing there have been included not only monographs devoted to specific phases of Colonial education but also more comprehensive works which have good sections or chapters on education during the Colonial period. For convenience the titles have been grouped into the following categories:

1. Studies of education along statewide or sectional lines
2. Studies in the ecclesiastical control of education
3. Studies in the developing civil basis of education
4. Studies in elementary, secondary, and intermediate education
5. Studies in higher education.

Studies of Education along Statewide or Sectional Lines

Interest in histories of education along state lines was greatly stimulated at the time of the centennial celebration held in Philadelphia in 1876, when several states produced histories for that exhibit. Shortly thereafter a series of state histories of education was begun under the direction of Professor Herbert B. Adams and published in the Circulars of Information of the United States Bureau of Education from 1887 to 1903 (2). These histories were useful contributions at the time, but they were of extremely uneven quality. Some were quite inadequate according to standards of historical scholarship. The references to education during the Colonial period were usually scanty and showed little or no use of original documents. A considerable amount of early material on Colonial school systems is contained in Barnard's *American Journal of Education* (3).

New England colonies—In the nineties wide attention was called to Colonial schools when Martin (78) and Draper (34) carried on their lively controversy concerning whether Massachusetts or New York had contributed more to the development of the American public school system. In 1915 Jernegan (57) contributed a valuable and well-documented description of the important factors which influenced the beginnings of schools in the New England colonies. Butler (19) has made a recent study of Colonial schools in New England as revealed by early newspapers. For Maine, Chadbourne (22) gave a careful study of early schools in relation to their social and economic backgrounds. Bishop (6) and Carroll (20) produced two of the better state histories of education for New Hampshire and Rhode Island, respectively, but they included only a few pages on Colonial education.

Middle colonies—There are few examples of comprehensive colonywide studies of education for the middle colonies. In addition to Draper's study (34) of New York, early collections of source material concerning the beginning of education in that colony were made by Pratt (92) and Finegan (38). Wickersham's history (132) of the schools of Pennsylvania has been extremely valuable, in spite of some inadequacies. The best general record of Colonial education in Pennsylvania is that of Mulhern (86) made in 1933, with special reference to the conditions of secondary education.

Southern colonies—Although the Southern colonies may not have received as much early attention as some of the other colonies, numerous studies of recent years have greatly increased our knowledge of Colonial education in the South. Knight (68) and Jernegan (60) have written general accounts of the development of Colonial education in that section. Heatwole's study (49) of Virginia and Knight's study (69) of North Carolina were substantial studies, which, while written as textbooks, were based on authentic source material. Noble (87) has produced a more detailed and comprehensive history of education in North Carolina. Boogher (8) and Bowden (9) have done the same for early secondary education in Georgia. For South Carolina there is the history written by McCrady (73) in 1883, and a later work by Thomason (123).

Studies in the Ecclesiastical Control of Education

It is difficult to differentiate between civil and ecclesiastical control of education in most schools of the Colonial period. In the New England colonies the civil state and the Calvinist church were, except for Rhode Island, so indistinguishable that a study of New England town and district schools is virtually a study of Calvinist schools. The same close connection between church and state obtained in the Dutch colony of New Amsterdam, and in lesser degree in the Anglican colonies.

On the specifically religious side of schools in New England four studies may be mentioned here. From sermons, pamphlets, and children's books, Fleming (39) reconstructed the religious teaching of the New England church and home and the emotional responses of children to that system of indoctrination. Holtz (54) studied the religious and moral elements in American education up to 1800. Stewart (121) made a careful study of religious education and of the relation between church and school in Connecticut. Smith (119) did the same for Massachusetts.

The Dutch Reformed branch of the Calvinist faith has received considerable attention for its educational activities. Dunshee (35) made an early study of the Collegiate Reformed Dutch school in New York City, and his work has been supplemented and corrected by the important work of Kilpatrick (64, 65) who studied all of the Dutch schools in New Netherlands and Colonial New York. Hall (43) made a study of religious education in the schools of New York with a chapter on the Colonial period. Another important study is that of Livingood (71) who has written a careful story

of the Reformed church schools in Pennsylvania in the eighteenth century. The part which the Quakers played in the education of Colonial Pennsylvania and New Jersey was thoroughly investigated by Woody (134, 137), and of New England and North Carolina, by Klain (66, 67).

The support of schools by the Anglican Church has been treated by Kemp (63) who studied the activities in New York of the Society for the Propagation of the Gospel in Foreign Parts, and by Brewer (10) who devoted several pages to the Colonial period in his history of religious education in the Episcopal church to 1835. Bell (5) studied religious education in Virginia, and Wells (131) prepared a thorough and judicial monograph on the parish schools of the same colony. The educational activities of the Lutherans in Colonial Pennsylvania are represented in the painstaking study by Maurer (79). The Colonial period of Mennonite educational activity is discussed in the first part of the study made by Hartzler (45) who relied for much of his description of Christopher Dock upon the study by Brumbaugh (16). The charity school movement as a whole in Colonial Pennsylvania was discussed in an earlier and briefer study by Weber (130).

The activities of the Catholic Church in American education antedated that of all other denominations if the schools of the friars in the South and Southwest are considered. That story is told at some length by Burns (17) in his general history of the Catholic school system in the United States, which relies almost entirely on secondary materials. More scholarly, but containing less on the Colonial period, is the study of McGucken (74) concerning the educational work of the Jesuits.

Studies in the Developing Civil Basis of Education

The story of the increasing authority of the civil government in the control and support of Colonial education has been told largely in studies of the development of the district system of control and of the laws requiring compulsory apprenticeship and schooling of poor and dependent children. One of the earliest compilations of Colonial legislation which referred especially to education was that by Hinsdale (51), but a much more thorough and complete collection of educational legislation passed by Colonial governments was made by Parsons (89). In addition to these works of compilation, considerable intensive study has been made of the growth of the district system and the extension of civil control over education in Massachusetts. Suzzallo (122), Updegraff (127), and Jackson (55) made competent studies which have contributed substantially to our knowledge of this phase of Colonial education. Also important and pertinent here is the work of S. W. Brown (15) which, while it deals mainly with the national period, gives considerable attention to the Colonial origins of state control of education.

The other phase of research which has thrown light upon the development of civil control of education has to do with laws concerning the compulsory education and apprenticeship of dependent children. Seybolt (104) made a contribution to this field in his study of apprenticeship and appren-

ticeship education in Colonial New England and New York. Jernegan (58, 59, 61) followed with periodical articles and more recently with a book in which he questioned some of Seybolt's conclusions and produced an important study of the origin and development of laboring and dependent classes in Colonial New England and the South with illustrations of the attendant social and economic problems, especially that of free education and apprenticeship for poor children. Douglas (33), in his general study of apprenticeship and industrial education, included two illuminating chapters on the Colonial period. Concentrating upon the colony of Virginia, Wells (131) showed the extent of public support of education in that colony. Maddox (76) also studied the free school idea in Virginia before the Civil War, but he included only a few pages on the Colonial period.

Studies in Elementary, Secondary, and Intermediate Education

Elementary schools, subjects, and textbooks—Considerable research has been directed to reproducing what actually went on inside the Colonial schools. Among the first in this field were the studies of early schools made by Small (116), Johnson (62), and Meriwether (81), all of which went into detail concerning the physical surroundings of Colonial schools, the life and spirit of pupils and teachers, the courses of study and the textbooks commonly used. Among the readily available studies which have been made of particular fields of Colonial subjectmatter are those by Monroe (82) on the development of arithmetic as a school subject, by Lyman (72) on the early teaching of English grammar, and by Simons (114) on the introduction of algebra into American schools in the eighteenth century.

Several detailed studies have been made of the various Colonial textbooks. A quite thorough history of the characteristics and influence of the horn-book in Europe and America was made by Tuer (125) in 1897. *The New England Primer* received extremely detailed treatment at the hands of Ford (40) and Heartman (48). Heartman (47) also published recently a bibliographical checklist of several different types of primers in use other than *The New England Primer*. Another important and quite rare book in this field is that of Littlefield (70), a famous Boston bookseller.

An interesting and yet often little noticed aspect of learning in Colonial educational activities is represented by the samplers which girls made in the dame schools. Bolton and Coe (7) made a large collection of such early samplers and devoted certain chapters in their book to the dame schools and schoolmistresses. The most valuable and thorough study of the education of Colonial girls is contained in the monumental study by Woody (136) who also provided an extensive bibliography on the education of women.

Secondary and intermediate schools—The New England Latin grammar schools have come in for a considerable amount of study. Early examples of such studies are those by Dillaway (32) who wrote about the free

schools of Roxbury, and by Jenks (56) who studied in detail the Boston Public Latin School, the story of which has been brought down to the present by Holmes (53) in an able tercentenary history. Among the numerous general studies of the New England grammar schools, let it suffice to mention here the work of Small (117), Martin (77), and especially Seybolt (108) who has recently made a careful study of the public schools of Colonial Boston based upon extensive documentary evidence of varied sorts. Shipton (112) made a case for the position that the Puritans were not narrowly religious in their view of education but had broad secular and social ends in mind.

Although the older histories of education would lead us to believe that secondary education in the colonies was rather exclusively an affair of the Latin grammar schools, the work of Seybolt (105, 106, 107, 110) has been influential in dispelling that notion. His significant investigations of private and evening schools in Colonial America showed that an intermediate type of education which was more practical and more useful for commercial, business, and social life was widely available and utilized by Colonial boys and girls.

Schoolmasters and educators—The life and character of Colonial schoolmasters received considerable attention in some of the treatises mentioned above, but special reference may be made to other studies here. The early Dutch schoolmasters of New Amsterdam were studied by Van Vechten (128), and Seybolt (109) investigated and listed the schoolmasters of Colonial Boston. The most famous of all Colonial schoolmasters, Ezekiel Cheever, has had much written about him, the most valuable of which is perhaps the work by Gould (41) together with such references as were made to him in studies of the Boston Public Latin School (see above). Information regarding other early schoolmasters, such as Elijah Corlett and Edward Hopkins is given in Barnard's *American Journal of Education* (3).

A significant study was made by Brumbaugh (16) of the life and works of Christopher Dock, pioneer Mennonite schoolmaster and educational writer. The Irish Colonial schoolmasters have elicited considerable interest, especially in a series of articles by Purcell (93, 94, 95, 96, 97, 98, 99). Woody (135) helpfully edited the educational writings of Benjamin Franklin, and Curti (27) gave some attention to the Colonial period in his book on the social views of American educators.

Studies in Higher Education

In the past the histories of American institutions of higher learning have neglected or treated superficially the social and intellectual currents which have influenced the shaping of policies and curriculums of the colleges. They have been largely concerned with such external features of the colleges as the cataloging of faculties and students, detailed descriptions of outstanding personalities, personal reminiscences of professors, detailed accounts of fires, new buildings, financial resources, and enrolment of

students. Of such nature were many of the earlier histories of individual universities and colleges as well as the state histories of higher education which appeared in the Circulars of Information of the United States Bureau of Education and the later series entitled *Universities and Their Sons* (24).

General studies—Despite the very considerable amount of research that has been expended upon American higher education, there has been written only one general history on the subject; that is the work of Thwing (124). Although valuable in its time, it is now inadequate in many respects. The definitive history of American higher education has yet to be written. Snow (120) set out to survey the development of the college curriculum, but his work was hardly more than preparatory to a comprehensive treatment of that theme.

Several studies have cast illumination on other aspects of higher education covering several institutions. Broome (12) studied the historical development of college admission requirements; Smallwood (118) investigated the examination and grading systems in early American colleges; Shores (113) brought together materials to illustrate the origins of college libraries; Elliott and Chambers (36) compiled the charters and basic laws of fifty-one universities, including six of the nine Colonial colleges; and Walsh (129) made a study of the dependence of the Colonial college curriculum upon medieval scholastic philosophy.

Studies dealing with individual institutions—Harvard has probably been the most studied of all the Colonial colleges. Among the early histories, that of Quincy (100) deserves special mention for its treatment of the development of the Harvard system of administration. All earlier studies of Harvard have now been superseded by the one which is being written by Morison. When all the volumes of the projected series have been completed, this work will probably be one of the most complete and significant histories of any American educational institution. Volume one (84) dealt with the founding of Harvard down to 1650, together with its medieval, renaissance, and reformation backgrounds. Volume two (85) continued the story during the seventeenth century from 1650 to 1708. Treating all aspects of Harvard's history, Morison has done an exhaustively thorough piece of work and has set a high standard of scholarship. Coupled with bright pictures of outstanding presidents and individuals, his work is at once humorous and revealing and will be a solid contribution to the intellectual and educational history of the United States. Rand (101), Seybolt (111), and Norton (88) have also aided in rounding out the growing picture of life and study at Colonial Harvard.

No other Colonial colleges have been the subject of such devoted study. Two early studies of the College of William and Mary were made by Tyler (126) and Adams (1), but both were little more than sketches. The most complete and helpful history of Colonial Yale has been contributed by Dexter (29, 30). Although no adequate history has been written of Princeton, MacLean's early study (75) and Collins' more recent book (26) are helpful, and the letters of William Paterson (90), a Princeton graduate in

1763, have been edited by Mills and provide interesting and illuminating sidelights on early college life and thought. Guild (42) contributed copiously on the early history of Brown, giving especial and not too critical attention to the work of the first president. Bronson (11) has written a scholarly history of Brown with considerable attention to the Colonial period. In 1904 the one hundred and fiftieth anniversary of Columbia College was celebrated by the publishing of a commemorative history (52) written by teaching and administrative staff members. It enlarged on the earlier sketches written by Moore and Van Amringe. The latter wrote the section on the undergraduate college for this volume and in it devoted considerable space to the Colonial period. The standard history of Dartmouth was written by Chase (25), the first volume of which dealt with the Colonial college. Richardson's recent history (103) of Dartmouth is a running account for the general reader. Montgomery (83) wrote a detailed and documentary history of the University of Pennsylvania from its foundation to 1770, with considerable material concerning the early history of Franklin's academy and college from which the university grew. A workmanlike history of Rutgers has been written by Demarest (28), a president of the college, in which is contained an extensive bibliography of titles relating to the history of the college.

B. HISTORY OF AMERICAN EDUCATION SINCE THE BEGINNING OF THE NATIONAL PERIOD

The decision to include in these brief summaries works on the history of education regardless of publication dates has made the task of preparing the section for the United States difficult. Of the many studies that have been made only a few could be included. The selection has been made on the basis of excellence as judged by the compiler, except that some inferior studies are listed when no others have been made on the topic or period treated, and some rather good studies have been omitted when others, judged to be more critical or more comprehensive, have covered much the same ground.

General References

Bibliographies—No thoroughgoing attempt has been made within recent years to compile a bibliography of the history of education. The several bibliographies prepared near the opening of the century contain few titles of current interest and are of historical value only. The best available bibliographies are those found in the two outstanding textbooks (174, 223). Historical studies published between 1906 and 1931 are listed in annual volumes of *Writings on American History* (201), a section of which is devoted to educational history. An index to these volumes covering the years up to and including 1930 is now being compiled.

Textbooks—An entirely adequate history of American education has not yet been written. Knight (223), in the preface to one of the two cred-

ible and somewhat satisfactory recent histories of American education, repeated a statement made in the earlier edition of the same work to the effect that a complete history cannot be written until more extensive study is made of the sources for every period from the Colonial to the present. The lack of such research is responsible, in the main, for the inadequacies of Cubberley's *Public Education in the United States* (174), the other relatively competent treatment of our educational history. The latter book is a revision of an earlier work which dominated college and university courses in the history of American education for more than a decade. Judged by modern standards of history writing, the texts of both authors may be criticized; however, there are no other treatments of the entire field of American education which equal them. A well-selected compilation (175) of source and illustrative materials accompanies Cubberley's revised work and supplements, to a certain extent, Knight's volume.

Other general histories of American education are those by Dexter (184) and Boone (156). The former is more than thirty years old but, for some purposes, is still useful. Boone's work, the first noteworthy attempt at a general history of education in the United States, is nearly fifty years old and is of little more than historical importance.

A number of works cover only a part of the entire period or only one section of the country. An example of the former is Thwing's account (285) of education since the Civil War. Illustrations of the latter are Knight's scholarly *Public Education in the South* (226) and numerous state histories of varying degrees of excellence.

Brief treatments of education in America are found in numerous general histories of education. Eby and Arrowood (188), Cubberley (173), Graves (200), Duggan (187), and others devoted several chapters or parts of chapters of their respective histories to tracing the origins and evolution of American education.

Encyclopedias and other general works—P. Monroe's *Cyclopedia of Education* (243), although published nearly a quarter of a century ago and in need of revision, is the most useful single work of reference. *The New Larned History for Ready Reference* (229) attempts to present a unified account of the history of American education by bringing together significant sections from standard works. Barnard's *American Journal of Education* (139), in thirty-two volumes (1855-82), supplemented by the *Analytical Index* (139), constitutes a virtual encyclopedia treating many aspects of the history of education during the first century of the national period.

From 1867 to the present, various publications of the United States Office of Education (called the Bureau of Education from 1869 to 1929) have presented administrative reports of the Office; lengthy monographs on educational subjects including state histories of education; reports on contemporary important movements in education; accounts of conventions; abstracts of legislation and books; and statistics on schools of all grades. There are useful indexes to the publications of the Office (288, 289, 290).

For more recent years the *Education Index* and the *Document Catalogue* are useful.

Considered collectively, the *Addresses and Proceedings of the National Education Association* (title varies) from 1857 to the present and the publications of its many departments constitute an important body of reference material. The volume of *Addresses and Proceedings* for 1906 serves as an index to all preceding volumes which consist for the most part of papers written by leading educators upon many problems in the field.

The Development of Educational Policy

Until recently educational policy was accepted as the contribution of theorists by historians who failed to recognize that these theorizing reformers lived and worked in a society in which the operation of numerous forces was constantly creating new educational problems.

Cubberley broke new ground in 1919 with his history of American education (174), in which a sustained effort was made to show the interrelationships between education and political, social, industrial, and other forces. Counts and others (172), in 1934, examined "the social background of American education from the beginnings of national organization and activity." Curti's recent study (179) shares with Counts' work "the recognition of tradition, accepted ideals and social habit as powerful forces in contemporary education," but where Counts attempted to discover these forces in the detailed development of the activities of American society, Curti "seeks to find them in the social ideas of leaders of American education." Reisner (269) traced the part nationalism has played in education in the United States and several other countries. These works and those by Knight (223, 226) recognize, as has never been recognized before, the bearing of various forces upon the development and history of our educational policy. They need to be supplemented, however, by numerous lesser studies which attempt to show the relation between education and other aspects of social policy.

Before the Civil War—The dominant ideas of the eighteenth century and our first attempts at educational planning were capably treated by Hansen (206). Several works dealing with Jefferson and his period indicated the influences of contemporary political and social forces. Arrowood (142) presented selections from Jefferson's writings on educational matters and appraised his services. This account should be supplemented by Honeywell's superior study (216), and by chapters from the works of Henderson (210), Heatwole (209), Maddox (233), and others.

The influence of the philanthropic movement upon the development of educational policy is treated in all standard manuals. However, a comprehensive history of the movement has not been written. Butler (165) devoted chapters to the Sunday schools, the infant school movement, and the Lancasterian schools. The work of the Public School Society of New York is authoritatively treated by Bourne (158). Fitzpatrick's study (194) on the educational influence of DeWitt Clinton contains some material on

the work of the Society. Fitzpatrick and Bourne also discussed the monitorial system and supplemented Reigart's thesis (267) on Lancasterian schools in New York. Parker (257) and others provided additional material on the philanthropic movement.

The influences on education of the rise of the democratic state, the triumph of Jackson and his party, and the extension of suffrage are not treated adequately in histories of education. Carlton, in 1908, pioneered with his study (166) of the educational consequences of the growth of population and manufactures, the extension of suffrage, and the humanitarian and labor movements. Curoe's more intensive study (178) of the educational policies of organized labor attributes considerably less influence to labor in the development of our school system than does Carlton. These works should be supplemented by Fish's engaging and competent treatment (193) of the "great economic, humanitarian, and intellectual currents" of the period 1820-50 when schools were one of the institutions which "the commonfolk sought to subdue to their own purposes." References dealing with the educational implications of the waning of old religious influences and of the development of new religious problems are listed in a later section.

The influence of the ideas and works of Mann, Barnard, and other leaders of the "Awakening" has been admirably set forth in Curti's study (179). For Horace Mann, this work should be supplemented by Hinsdale's study (212), an article by Mayo (237), and the voluminous *Life and Works of Horace Mann* (235). For Barnard, Curti's work should be supplemented by biographies by Steiner (277), Mayo (236), and others. Extensive extracts from Barnard's work, selected to reveal his educational beliefs, are presented in *Henry Barnard on Education* (162). Weeks's article (294) on Calvin Wiley adds to the materials presented by Knight (226, 227), and Noble (253). Other leaders of the "Revival" are treated in special biographies, in standard texts, in Barnard's *American Educational Biography* (143), in P. Monroe's *Cyclopedia* (243), and in numerous journal articles.

Cubberley (174) discussed the importance of the lyceum, school conventions, and other organizations in shaping educational policy. The influence of Southern leaders is discussed by Dabney (180). Cubberley also indicated the importance of reports of early American travelers, of European ideas, and of educational journals. Other works that enlarge upon Cubberley's treatment of these various influences are Hayes's *The American Lyceum* (208), Hinsdale's article (213) on foreign influences upon education in the United States, and Davis' study (181) of educational journalism during the nineteenth century.

The influence of the economic and social revolution in the Southern states is ably treated by Knight (223, 224), Noble (253), and others. Dodd (186) pictured the political and economic background of the antebellum period, and Cole (170) set forth the "results of sectional clashes on educational efforts and intellectual life."

Since the Civil War—The effects of the Civil War and Reconstruction upon educational policy in the South are capably treated in the works of Knight (224, 226), and Noble (253); in Weeks's history (295) of education in Alabama and Cochran's study (169) of education in Florida; and by a number of lesser histories of education in Southern states. Fleming (195) provided additional background and materials.

For the period since the Civil War, historians have given much space to the influence of reformers on the development of educational policy. Curti's work (179) dealt at length with the ideas of Harris, Spalding, Hall, James, Thorndike, and Dewey. Textbooks of the history of education, particularly Parker's (257), have treated the contributions of Pestalozzi, Herbart, and Froebel to American education. The Pestalozzian movement in America was traced by Barnard (146) and Will S. Monroe (245). De Garmo (183) discussed the development of the Herbartian movement in Germany and the United States. Reisner (268) and others presented good accounts of Froebel's influence.

No history of education adequately interprets the educational implications of changes that have taken place in the social structure since the Civil War. Nevins (252) described economic and social life in all sections of the country immediately after the War. Schlesinger (271) pictured the movement toward the city; the increase in crime, vice, and graft; the growth of the slums; and the changes adversely affecting the lives of children. However, he also treated the city as a force making for a finer and broader civilization, promoting social reform, and providing more educational advantages and opportunities for leisure.

For the more recent period, Judd's monograph (218) and others prepared under the direction of the President's Research Committee on Social Trends are indispensable. These reports are presented in condensed form in *Recent Social Trends in the United States* (262). The works of Counts and others (172), Slosson (272), and Tugwell and Keyserling (287) set forth different social philosophies for the period.

The Development of State Systems of Education

The development of free public state systems of education is the principal theme of standard manuals. Many aspects of this movement are more fully discussed in Cubberley's *State School Administration* (176). Knight (226) treated all phases of the development of systems of education in Southern states. Mayo (291) described the development of common schools in all sections of the country in a series of often cited, but somewhat uncritical, articles. Butler (165), employing newspapers as sources, discussed common schools before 1850.

Educational histories of varying degrees of excellence trace the development of common schools in nearly all of the states. Among the superior ones are those by Knight (227), Noble (253), Cochran (169), and Weeks (295), already mentioned; and those by Bishop (149), Bolton and Bibb (154), Carroll (167), and E. A. Miller (241). In addition, state histories

by Wickersham (296), Boone (157), Murray (251), Randall (264) and others are of some value. For others, the reader is referred to the section of this issue that deals with state histories of education.

School support—There is no comprehensive history of school support. The topic, however, is treated in all standard manuals. These are supplemented by Cubberley's *State School Administration* (176); Swift's old but authoritative history (281) of permanent school funds, as well as his more recent studies (280, 282); Mayo's article (238) on the establishment of school funds; Butler's chapter (165); and Barnard's article (144) on the Connecticut school funds; and other articles.

Mead (239) discussed taxation and the rate bill as found in the historical development of the school systems of Michigan and Connecticut. The struggles to provide tax support in the various states are described in appropriate state histories. Among these, Finegan's *Free Schools* (192) not previously mentioned, is good on the movement in New York. Burgess (164) studied the increase in school expenditures between 1840 and 1920, and Pitkin (260) dealt with the revival of education after the great depression in our history. However, serious gaps remain in the record of financing public education.

Public school administration—The best general histories of public administration are to be found in the standard texts, which present brief accounts of the decline in sectarian influences; the state's assumption of the educational function and the struggle to establish control over local districts; and the creation of administrative offices and development of the duties and powers of school officers. Cubberley's *State School Administration* (176) is a basic reference. Struggles to establish control in the various states are traced in works that deal with the educational labors of Mann (177, 212, 235, 237), Barnard (162, 236), and other leaders of the early movement for state schools. The reports of state educational officers, particularly those of Mann and Barnard, are important.

The centralization of state control is treated in numerous state histories of education and in special works, such as those by Fairlie (191), Orth (255), Rawles (265), Webster (293), and Strayer (279). *Modern School Administration* (138) dealt with progress in educational administration since the beginning of the century. The development of the city school superintendency was studied by Gilland (197), and the public school principalship by Pierce (259). Both studies are examples of needed research.

The secularization of education is well treated by Cubberley (174). S. W. Brown (161) competently discussed all aspects of the topic. Confrey (171) presented a brief statement on the subject from the Catholic point of view. A. J. Hall (204) and Bourne (158) treated all aspects of the movement to secularize the schools of New York. Bell's long and careful study (147) explains "present day attitudes toward the problem of religion in education, the relation of the church and state to that problem, from the point of view of historical development" in Virginia. The history of the

movement in Massachusetts and Mann's part in the struggle was traced by S. M. Smith (275) and Culver (177). These latter should be supplemented by numerous pamphlets and journal articles.

Secondary Education

The history of secondary education receives appropriate emphasis in standard texts and state histories of education. More detailed accounts of the various types of secondary schools and the development of state systems of secondary education are to be found in E. E. Brown's *The Making of Our Middle Schools* (159), which, although nearly thirty-five years old, is still useful. The excellent chapter in Kandel's *History of Secondary Education* (219) should be expanded to book size. Mulhern's recent and important history (250) of secondary education in Pennsylvania sets a standard of excellence too seldom attained in historical research in education and represents a type of much needed research.

The academy movement—A comprehensive history of the academy movement has not been written. E. E. Brown (159) discussed many aspects of the movement in the United States. Knight (226) traced the origin and spread of academies in the South. G. F. Miller (242) provided a first-rate history of the academy movement in New York. Butler (165) devoted a chapter to the history of academies as revealed in New England newspapers. The growth and decline of manual labor institutions in America was treated by Anderson (141). Knight (225) traced the rise, spread, and abandonment of these institutions in the South.

Origin and development of the high school—Textbooks on the history of education, histories of secondary education, state histories, and special works in the field of secondary education are rich in materials on the origin, development, and present status of the high school. Inglis (217) treated the rise of the high school in Massachusetts. Hertzler (211) and O. B. Griffin (202) traced the origin and development of the high school in Connecticut. Gifford (196) studied the development of the New York state high-school system. Grizzell's important study (203) of the origin and development of the high school in New England is organized by periods and states. *The American Secondary School* by Koos (228) is a basic treatise on the modern secondary school. It should be supplemented by numerous journal articles and the publications of appropriate educational organizations.

Extension of secondary education—The recent reorganization and extension of secondary education is discussed briefly in current histories of education and in standard treatises on the junior high school and the junior college. Bunker (163) traced the junior high-school movement to its origin and described practices in 1916. Eells's book (190) is an excellent text on the work and history of the junior college. Additional materials on the newly organized secondary-school units are to be found in educational journals, reports of committees, and in publications of various educational societies.

Methods and Materials of Instruction

Except for brief treatments in texts, there are no general accounts of the development of methods of teaching or of the evolution of school curriculums.

History of methods—The development of methods in particular subjects is traced by a number of authors, among whom are the following: for arithmetic, Walter S. Monroe (244); for reading, Reeder (266); for geography, Phillips (258); for grammar before 1850, Lyman (230); and for history between 1825 and 1850, McManis (232).

The introduction of English-Pestalozzian methods, the influence of Herbart upon methods, and the contributions of later educators are traced in articles, monographs, and books on methodology.

Changes in the curriculum—The nearest approach to a general history of the curriculums of American schools is that by Rugg (270). Stout (278) traced the development of high-school curriculums in the North Central states from 1860 to 1890. Histories and other treatments of individual school subjects describe the modification of the old subjectmatter and the introduction and development of new studies. In addition to the works of Monroe, Reeder, Phillips, Lyman, and McManis previously cited, Powers' history (261) of the teaching of chemistry is of value. The development of manual training and various aspects of industrial and vocational education were traced by H. R. Smith (274), Anderson (140), Bennett (148), and Coates (168).

Numerous articles and longer studies trace the introduction and development of art, commercial subjects, home economics, and other additions to the course of study. The influence of the reports of the committees of the National Education Association and of other national committees is treated in Rugg's article (270), in textbooks in the history of education, in works on particular school subjects, and in numerous minor studies. Recent attempts to reconstruct the program of study are reported in special works on the curriculum, journal articles, and publications of societies organized for curriculum and other educational research.

History of the Training of Teachers

The history of the training of teachers in academies, normal schools, teachers colleges, and universities is traced in the standard texts. A more detailed account of the teacher-training movement before 1890 is presented by Gordy (199). Pangburn (256) traced the evolution of the teachers college and teacher training since 1890.

Barnard (145) presented several interesting documents, prepared by Carter, Stowe, Gallaudet, and others, on the origin and early development of normal schools. S. R. Hall's *Lectures on School-Keeping* (205), recently reprinted, throws light upon the nature of professional instruction during the early years of the movement. For the first state normal school, *The Journals of Cyrus Peirce and Mary Swift* (254) provides among other

things, information concerning the program of studies, methods of teaching, proficiency of the scholars, and the accepted pedagogy. The Oswego movement was treated at length by Dearborn (182) and by Hollis (214).

The teacher-training movement in various states is traced in histories of individual institutions and in state histories of normal schools. Among the latter, two important works are Mangun's monograph (234) on the rise and development of the normal school in Massachusetts, and Meader's *Normal School Education in Connecticut* (240). One chapter of G. F. Miller's study (242), on the academy system of New York state dealt with the early attempts of academies to train teachers for the public schools. All aspects of the training of teachers in universities are discussed in numerous books and periodicals.

The History of Higher Education

A really good history of higher education is much needed. Thwing's history (286), until recently the only general account, is now supplemented by Wills's brief study (297) of the growth of American higher education. E. E. Brown (160) sketched the rise of a demand for state universities. The establishment of state and denominational colleges and universities before 1860 was traced by Tewksbury (284). Butler (165) devoted several chapters to newspaper accounts of Harvard, Yale, Dartmouth, Princeton, and other colleges before 1850.

A brief history of the land grant colleges was presented in the *Survey of Land-Grant Colleges and Universities* (222). Eckelberry (189) traced the history of the municipal universities.

Studies of particular aspects of higher education are numerous. Snow's study (276) on the curriculum, published in 1907, is still useful. Recent reforms in teaching, changes in the program of studies, and other changes are considered in various works. McGrath's study (231) of the evolution of administrative officers in institutions of higher learning is scheduled for publication. Blackmar's history (151) of federal and state aid to higher education and Bittner's work (150) on the university extension movement are useful but must be supplemented by more recent studies. Kirkpatrick's *The American College and Its Rulers* (221) is biased, but presents material not found elsewhere. Price's *The Financial Support of State Universities* (263), although limited to the old Northwest, is helpful.

All of the foregoing general and special accounts should be supplemented by catalogs, administrative reports, and surveys of individual institutions. Histories of separate colleges and universities, such as Morison's partly completed tercentenary history (246, 247, 248) of Harvard, and the biographies and autobiographies of great educators provide additional material on higher education.

The Education of Women

Woody's monumental history (299) of the education of women in the United States is thorough and comprehensive, and gives evidence of critical

authorship. Certain aspects of the movement are treated in a number of lesser works. The social conditions which brought about education for women were discussed by Boas (153). Taylor (283) traced the early history of women's higher education. The history of the movement in the South prior to 1860 was treated by Blandin (152). Short biographical sketches of Catherine Beecher, Emma Willard, and Mary Lyon, and extracts from their works were presented in *Pioneers of Women's Education* (198). A more complete statement of the educational work of Mrs. Beecher is found in Harveson's excellent biography (207). Present problems in the education of women are treated at length in current educational literature.

History of Negro Education

The history of Negro education is traced briefly in the standard texts, state and sectional histories of education, and in many special studies of Negro life and problems. Woodson (298) discussed the education of the Negro prior to 1861, and Bond (155) presented a history of Negro education from 1860 to 1933. Dickerman (185) also dealt largely with the period since the Civil War. Additional materials are to be found in the reports of philanthropic agencies, the histories and catalogs of Negro colleges and universities, and in autobiographies and biographies of Booker T. Washington and other Southern educational leaders.

The Relation of the Federal Government to Education

A comprehensive history of the relation of the federal government to education has not been written. Keith and Bagley's argumentative book (220) outlined the subject to 1920. The recent report (292) of the National Advisory Committee on Education discussed the various aspects of the problem as it exists today. D. H. Smith (273) and Holt (215) traced the history, activities, and organization of the United States Office of Education and of the Federal Board for Vocational Education, respectively. Other aspects of the relationship of the national government to education were presented by Cubberley (174, 176), Blackmar (151), Swift (281, 282), in the publications of the National Education Association, the United States Office of Education, and in many educational periodicals.

C. STATE HISTORIES OF EDUCATION

There is a prodigious amount of literature relating to the development of state and local school systems. Besides the treatises that may be roughly classified as state histories of education, there are countless pamphlets, bulletins, and magazine articles dealing with the history of particular colleges, or with educational development restricted by title to certain aspects, levels, periods, or localities. In this class, fall histories of school legislation, accounts of the development of school supervision, and treatises on the growth of public high-school systems without reference to institutions of elementary or higher grade.

Within recent years, school history has furnished thesis topics to numerous candidates for advanced degrees. A few of the studies in this field are significant; many are mediocre; and some are positively crude. Seldom does a study appear that attempts a critical evaluation of methods, men, or movements in education. More often, the writers have been content with compiling source materials and laying them before the reader in intelligible English. Much that has been done fails to meet the requirements of modern research.

The National Society of College Teachers of Education recently became interested in this field of study. In 1929 its Committee on State Histories of Education, under the chairmanship of Stuart G. Noble, reported an evaluation of the historical data of forty-eight states (333). The Committee discovered sixty-two treatises that, for one reason or another, might be classified as state histories of education. In addition to these, the Committee examined and evaluated seventy-five printed documents relating to school history and an uncounted number of masters' theses in manuscript form. Its survey of the literature of the subject was practically complete. The present review of research studies need add little to the Committee's findings up to 1929. Nevertheless, in view of the fact that the report for the earlier period has not been widely circulated, it is desirable to include the chief items of the Committee's survey in this discussion.

Sporadic Attempts at History Writing

One of the earliest efforts, if not the first attempt, to present a comprehensive account of the development of a state school system appeared in Taylor's *A Manual of the Ohio School System* (346) published in Cincinnati in 1857. Sporadic attempts at writing the life stories of separate institutions and local school systems, however, have been found among the records of several of the older states. These efforts deserve to be mentioned only because of priority.

The Centennial Exposition, held in Philadelphia in 1876, furnished an impulse to the writing of the earliest state histories of education. It appears that the several states were invited to prepare for exhibition accounts of the development of their school systems. Indiana (337) and Ohio (323) prepared and published locally for this purpose, somewhat elaborate historical exhibits. Impelled, no doubt, by the same motive, Rhode Island (343), Wisconsin (352), and California (344, 345) during the same year printed state histories of education. With the exception of the history of California which was prepared in its entirety by the distinguished John Swett, all these accounts were the result of collaboration. The promoters of the history in each state enlisted for the task a group of prominent school officials, college presidents, and others having special knowledge of the subject. Each of these men contributed his account of the particular institution or phase of education which he knew best. This cooperative endeavor is an easy, but by no means effective, method of preparing a state history of education. The Committee on State Histories of Education, in making its appraisal

of such works, condemned the collaborative method on the ground that the writers too frequently permitted local interest, personal bias, and institutional loyalty to interfere with an impartial presentation of the story.

The World's Columbian Exposition, held in Chicago in 1893, gave an added impulse to the same sort of composition. At least two states, Kansas (315) and Wisconsin (339) prepared educational exhibits on what had now become apparently the regulation pattern. The histories of this series, as well as that of 1876, though they may have in some degree served the purpose for which they were written, are far from being adequate when judged by modern standards.

The Circulars of Information, 1887-1903¹

During the administration of Commissioner Dawson, the United States Bureau of Education initiated in 1887 the policy of publishing as Circulars of Information the educational histories of the several states of the union. The policy was continued by Commissioner Harris until 1903. By the latter date, the histories, wholly or in part, of thirty-five states had been published. The remaining states not treated, were, in most instances, too young at that time to have any but brief histories.

Herbert B. Adams, professor of history in the Johns Hopkins University, was editor-in-chief of the series. For the writing of the histories, Dr. Adams enlisted talent wherever it could be found. To certain of his graduate students in Johns Hopkins University he assigned state histories as topics for their dissertations. The histories of North Carolina (338), Tennessee (328), and Louisiana (317), to mention only a few, were prepared as dissertations in partial fulfilment of the requirement for the Ph.D. degree. Upon several able assistants he relied for a part of the work. Bernard C. Steiner superintended the compilation of histories of Connecticut (340) and Maryland (341), and George G. Bush prepared works for Massachusetts (311), Vermont (310), New Hampshire (309), and Florida (308). For the histories of a number of the states, Dr. Adams secured as authors, prominent educators, better qualified by their long residence and intimate acquaintance with local institutions than by technical skill in writing history. Judge Edward Mayes of Mississippi and Dr. Willis G. Clark of Alabama were contributors of this type.

Nineteen volumes of this series appeared under the title "History of Education"; sixteen, under the title, "History of Higher Education." In general, there is little distinction to be made between the two, the chief emphasis in both instances being laid on secondary and higher institutions. The same method of preparation seems to have prevailed throughout the series. Following a brief introduction, which presented the political and social setting of early times, the author usually described the first schools, and proceeded next to outline the progress of educational legislation. He then described separately the development of each of the more important institutions of

¹ The bibliography of this series is too lengthy and too well known to students of education to be repeated in full, but the conspicuous state histories cited in this article are included here.

secondary and higher grade, apportioning the greater space (in some instances, nearly half the book) to the history of the state university or of the leading college. In many cases the author functioned mainly as a compiler of the histories of separate institutions, written by their respective presidents or specially chosen representatives.

The Committee on State Histories of Education in 1929 made an appraisal of all these Circulars of Information. Although the members of the Committee necessarily submitted the works to the test of more recently derived standards, they kept in mind the fact that the accounts were written thirty or forty years ago when the application of the scientific method either to education or to the writing of history was yet in its infancy. They remembered that the chroniclers of the eighties and nineties were pioneer historians of a pioneer period.

The Contributions of Stephen B. Weeks

After a lapse of a decade, the United States Bureau of Education resumed the responsibility for preparing state histories. Commissioner Claxton retained the services of Stephen B. Weeks as staff specialist in charge of this department. Weeks, a competent scholar, evidently recognized the need for rewriting some of the earlier publications of the Bureau when he prepared new histories for Arkansas in 1912 (350); Alabama in 1915 (348); Delaware in 1917 (351); and Arizona in 1918 (349). Taking the histories of Weeks as a whole, they set a standard somewhat in advance of the average of the Bureau's earlier series.

Histories of Education by School Officers

A number of state departments of education have published histories. The authors of such books, in most cases, have been superintendents. Among the states that may be mentioned are Kentucky (319), Maine (342), and Wisconsin (334). In addition to these, several other accounts have been published locally, but apparently not under the auspices of state departments. Included in this number should be mentioned Swett's two books on education in California (344, 345), Harris' series of articles for Louisiana (320), and Putnam's work on the Michigan school system (335). The list of such works can doubtless be considerably extended, but these references are sufficient to establish a classification for the type we have in mind. Speaking of these local products, the members of the Committee on State Histories of Education did not underestimate their value as treasuries of useful information of the kind best found in the personal memoir. Their authors having access, as was frequently the case, to documents no longer available, preserved data that would otherwise have been lost. The inexperience of the authors in the writing of history, however, cropped out repeatedly. The authenticity of their statements could not always be attested; their sense of proportion was sometimes warped by personal interest. Seldom did they get more than a narrow, legalistic view of the great na-

tional movement. This class of writings, therefore, failed to attain to the standards of excellence fixed by the Committee.

Eight Creditable State Histories of Education

The Committee found eight treatises that met the requirements of a readable narrative of convenient length covering the entire span of the history of the state, limited to public institutions and including a treatment of the social, economic, and political background. These are scholarly treatises written with due regard to the more recently derived standards of writing history. While these were reported subject to certain limitations, they approximately met the specifications designed by the Committee for such a treatise. Space does not permit more than the listing of these writers in this connection: Weeks (348), Cochran (314), Bishop (302), Carroll (312), Eby (316), E. W. Knight (324), Raymer (336), and Aurner (300).

In concluding its report in 1929 the Committee called attention to the fact that most of the histories which it had examined were out of date, out of print, incomplete, and unreliable. It cited the need for authoritative, historical treatises to be used by research specialists, writers of school surveys, curriculum makers, and other investigators of current school problems. Early in the next year, the Committee petitioned the United States Commissioner of Education, William John Cooper, to sponsor the publication of a new series of state histories of education. The Commissioner's assent was prompt and cordial and the Committee undertook to supply manuscripts for the purpose.

Some half a dozen manuscripts were collected, but upon examination by the Committee, only two were found to be suitable for the purpose in view. One of these has been published by the Office of Education; the other, submitted during the early years of the depression, could not be published because of shortage of revenues allotted to the Office. Several members of the Committee have begun to prepare manuscripts but no one, as yet, has completed his work. The ardor of the would-be historians has doubtless been dampened somewhat in recent years by the uncertainty of publication.

The number of the new series published so far is the *History of Education in Washington* by Bolton and Bibb (303). The Committee was fortunate in having a volume so well conceived and so judiciously executed appear as the first number of the series. This is a comprehensive survey of public educational institutions of all levels, including also a brief treatment of the history of private schools. The reader is led to see how the great national movement for education worked itself out in this Far-Western state. The space is well apportioned to legislation, school revenues, supervision, certification of teachers, etc. The authors have done more than merely set down facts; they have ventured to evaluate and make critical comments on the data. The book will serve as a good model for the treatment of a state with a brief history.

Since the publication of the Committee's report M. C. S. Noble (332) has published a history of the public schools in North Carolina. The

account, which has been termed "an illuminating commentary on progress in a democracy," is based on old records, letters, and diaries and brings the story of education in that state down to 1900. It is an interesting and instructive volume.

Most recent studies are limited as to period covered or school level. Theses writers in institutions of higher learning since 1925 have turned in increasing numbers to the history of secondary education for titles of their dissertations. According to a bibliography of the United States Office of Education for the years 1927 to 1932, more than twenty writers prepared papers on the development of state high-school systems. Although some of these are creditable studies, very few have been published.

Two notable state histories of secondary education, however, should be mentioned in this connection. The first of these by Boogher (304) gives an account of the development of academies and high schools in Georgia from 1732 to 1858. For the period covered, the work has been well done. The second, by Mulhern (330), is more comprehensive. The author traced the history of secondary education in Pennsylvania from the settlement of the colony down to 1930. The extent of Mulhern's bibliography suggests the thoroughness of his inquiry. His list of sources alone requires seventy-three printed pages, of which fifteen pages are devoted exclusively to the titles of manuscripts used in the preparation of the volume. In no other state has the history of secondary education been so competently treated.

The history of elementary education has proved to be much less popular with theses writers. Brown (307) recently prepared a much-needed study of the public schools of Nevada on this level, but his work has not yet been published.

A few teachers of the history of education make extensive use of the state history in the course on public education in the United States; many more find it indispensable for reference. Writers of school surveys, curriculum makers, and research specialists find it essential in providing the background of their studies. But it is as a contribution to the history of education in the United States that the state history serves its chief purpose. A comprehensive treatise that does justice to every section of the country and to every aspect of education must wait upon the completion of the local chronicles.

The writing of up-to-date scholarly treatises in this field offers an inviting field to research students in history or education. Most of the states are without dependable histories and eight of the Western states have no printed accounts longer than encyclopedia articles. It is to be hoped that the United States Office of Education will continue to publish worthy manuscripts. It is more to be hoped that the men and women who enter this field will prepare manuscripts that meet modern standards of scholarship.

D. HISTORY OF EDUCATION IN CANADA

The British North America Act of 1867 established provincial autonomy in education, confirmed the principle of state control, and contributed to the

centralization of school administration within each province. Section VI, subsection 93 provided, in part, that "In and for each Province the Legislature may exclusively make Laws in relation to education subject and according to the following provisions: (1) Nothing in any such Law shall prejudicially affect any Right or Privilege with respect to Denominational Schools which any class of Persons may have by Law in the Province at the Union." The provinces of Nova Scotia, New Brunswick, Quebec, and Ontario were confederated in 1867; Manitoba was organized as a province in 1870, British Columbia in 1871, Prince Edward Island in 1873, and Saskatchewan and Alberta in 1905.

The educational provisions of the British North America Act were the outcome of more than a century of conflict and compromise (358, 370, 374). Prior to 1763, beginnings under the direction of Roman Catholic Orders had been made in Quebec and Acadia, and under missionaries and lay teachers sent to Nova Scotia by the Society for the Propagation of the Gospel in Foreign Parts (356, 357, 372). After the conquest, the patriotic intent of the British government, acting in cooperation with the Anglican Church (370, 371), and the profound faith of the Scotch and New England settlers in the religious and social values of education (356, 370), made of the "school question" a permanent state issue. School systems reflecting the religious and racial traditions of Old France, of eighteenth and early nineteenth century England, of Calvinistic Scotland and New England, or representing a compromise of these traditions had taken definite form throughout Eastern Canada by 1867 (362, 370). The clash of religious and racial ideals in vigorous frontier settlements during a period of struggle for democratic institutions of government, produced two educational strains, the French Catholic and English speaking, the latter eventually to become largely non-sectarian. Moreover, the strength and singleness of leadership in matters of church and state, and the practical benefits to sparsely settled rural areas of governmental direction (357, 370) produced a tendency to safeguard, by law, established school practices, and to centralize school administration under state control. In every province of Canada, the duties and responsibilities delegated to administrative units and officials are specified in some detail and embodied in Public School Acts (364).

As the settlement of Western Canada, except for a few fur-traders, has occurred since 1867, the school systems of the West were patterned after those of the East (363, 370, 373). They have been modified to a greater extent by twentieth century trends in the middle and western parts of the United States. Although Canadians have clung with smug self-satisfaction to many traditional beginnings of pioneer days, they have not been able to evade the vigor of American educational research and experimentation (358, 365). This may be seen in Western Canadian cities where local initiative has had wider range, and in recent provincial regulations governing programs of study, textbooks, and provincial examinations (354, 364).

Educational Trends as Revealed by Provincial Legislation

Confederation, the growth of a Canadian spirit (370), economic development, the significant shift in population from rural to urban (359), and the persistent influence of trends in the United States, have so facilitated or promoted the interchange of educational thought that, although organized provincially, a Canadian pattern has evolved. We cannot remain provincial, even in Old Quebec (358). The truth of this may be seen by viewing Canadian school legislation prior to and following 1867.

Nova Scotia, New Brunswick, and Prince Edward Island—School legislation in Nova Scotia is representative of major trends in the three Maritime provinces. Educational beginnings were influenced by the Calvinistic and, to a lesser degree, by Roman Catholic and Anglican traditions (356, 370). The first government was formed in 1758 and in 1766 an act was passed providing for the state licensing of teachers in grammar and common schools (356). Important enactments following that date are summarized briefly as follows: 1780, financial provision for a school building and grammar schoolmaster in Halifax; 1794, annual grant to the Halifax grammar school and to other schools in the province; 1811, provision for the formation of school districts throughout the province, the encouragement of local assessment for school support; 1826, justices of the peace instructed to divide the counties into school districts; 1841, a provincial board of education; 1850, a provincial superintendent of education; 1854, a state normal school. The Free School Act of 1864 substituted a Council of Public Instruction for the board of education. This central body, composed of the Executive Council of the government in office, was made the supreme authority in education with power to license teachers, to prescribe programs of study and textbooks, to appoint inspectors and examiners, and to supervise the system in general (356). Ex-officio members have been added to the Council of Public Instruction in New Brunswick and Prince Edward Island. By the Act of 1864, Nova Scotia was divided into local school sections managed by an elective board of trustees in rural areas, and in towns and cities by a board appointed in part by the Council and in part by the governor-general-in-council. The Act of 1865 made elementary and secondary education free, the schools to be supported by local assessment and by county and provincial aid. The legislation of 1880 to 1885 organized the schools into a continuous system, Grades I to XII, and made secondary education preparatory to either normal school or university.

Quebec—Prior to 1763 little provision had been made for the habitant in rural parts (370, 375). The Act of 1801, providing for the organization of a national school in each parish or township, under the direction of trustees appointed by the government, did not meet with favor (366, 370). The Act of 1824, permitting local parishes to devote one-fourth of their income to school purposes, and that of 1829, providing for a school in each parish or township under the control of elected trustees were more successful (366, 370). Although the desire of the British government to use the school as an agent to foster the growth of British institutions among the

French population of Canada had failed it was successful in forcing co-operative action on behalf of the masses. The Act of 1841, supplemented by the Amending Acts of 1846 and 1849, established a system of common schools in each parish or township under an elected board of five commissioners and financed through local assessment and state aid. It also made provision whereby a religious minority might dissent, form a separate school under three elected trustees, and share the government grant with the commissioners' school (370). In 1856 normal schools were established under Catholic and Protestant supervision and supported by state funds. The Act of 1869 placed the school system under a Council of Public Instruction, composed of ex-officio and appointed members representative of the Catholic and Protestant elements of the population. The Act of 1875 constituted the Catholic and Protestant sections of the Council and gave to each the authority to function as a separate supervisory body with powers to prescribe curriculums and textbooks, to supervise examinations and teacher training, and to recommend teachers for certification. Until 1899 each section appointed inspectors for the schools under its supervision and still recommends to this position for appointment by the government (370).

Two school systems, subject to the instructions of the government but with lines of responsibility not clearly defined, supervise the activities of many overlapping school areas (361, 370). Religion is a fundamental subject in both Catholic and Protestant schools. The Protestant schools, although recognizing Grades I to VII as elementary and Grades VIII to XI as secondary, are organized under one board of trustees and have general as well as preparatory training as the educational aims of secondary education (360, 370).

Ontario—During the first half of the nineteenth century educational beginnings reflected the ideals of factions to the struggle for responsible government (370). It is difficult to determine the influence of religion or politics on school legislation during the period 1800 to 1840, as factional divisions did not completely correspond with the traditions of those who were parties to the struggle. The Grammar School Act of 1807 represented the wishes of the governing party and the Anglican Church, secondary education for the socially élite. It was not acceptable to the masses. The Common School Act of 1816 was championed by dissenters in both religion and politics. The determined support accorded either elementary or secondary education by political groups led to the definite organization of education at two levels, a condition still continued, in part, and one which influenced the organization of education in Saskatchewan at a later date. Moreover, the preparatory aim of secondary education has stubbornly maintained its place.

The Act of Union of 1840, Egertson Ryerson's appointment as superintendent in 1844, and his Report of 1846 mark the opening of a new era (362, 370). The Common Schools Act of 1850 framed by Ryerson provided for (a) the organization of "school sections" throughout the province, (b)

permissive local assessment for school support, (c) government aid to schools, (d) a general board appointed by the Crown, (e) a superintendent appointed by and responsible to the governor, and (f) local inspectors appointed and paid by the county council. The superintendent's office became the education office for the province, the general board an advisory body (370). In 1871 elementary education was made free, supported by assessment and township and government grants. In 1875 the superintendency and general board were abolished and replaced by a department of education under a minister of the government. That has become the practice in the four Western provinces. The extreme centralization of authority in 1850 was contrary to the principles previously advocated by Ryerson and the Reform party. It was freely charged that Ryerson had become converted to the Prussian plan of centralization. The Act of 1875 was in a measure a return to liberal principles in that authority was vested in an elective ministry. The situation has not changed greatly; the practice of a quarter of a century under Ryerson during formative days has become a tradition (369).

In 1853 the supervision of secondary education was placed under the superintendent. Although this made for unity, a high-school district overlapping an elementary-school district and with a separate board of trustees appointed in part by the county council and in part elected, still constitutes the typical secondary-school unit in large towns and cities. Union districts having both elementary and secondary grades under the one elective board of trustees are common in smaller centers (355, 370).

Some General Characteristics of Canadian Education

The Dominion government supervises and finances Indian education; otherwise it stands in the same relation to provincial schools as does the federal government in the United States. The Agricultural Instruction Act of 1913 appropriated \$1,000,000 a year for ten years in support of agricultural education. The Technical Education Act of 1919 made like provision for technical education. These grants were distributed on the basis of population. The Education Branch of the Dominion Bureau of Statistics, organized in 1921, issues an annual report and distributes information concerning education in all provinces. Beyond these provisions the central government has, so far, declined to assist provincial school systems.

Controls and finance—However constituted, the central authority acting through its committees and executive officers, either deputy ministers or superintendents, determines standards and directs the system (359). Authority delegated to local districts is rigidly defined and rather uniformly applied. The school district, of which there are approximately 23,000 in Canada, managed by elected trustees in rural areas or by boards constituted according to different methods in urban centers (361, 367), forms the local unit of administration except in Quebec and British Columbia. Almost 60 percent of the cost of all institutions of learning and 80 percent of the cost of publicly controlled schools is levied upon the real property

in local districts (359). Approximately one-sixth of the cost of public schools is paid from provincial consolidated revenue. Consequently, there exists great divergence in the ability of school districts to provide leadership and funds to meet educational needs.

School enrolment, organization, and curriculum—Canada had an estimated population of 10,376,786 in 1933 and a school enrolment in all educational institutions of 2,527,358 of whom 2,237,188 were in the ordinary day and technical schools, 84,953 in privately controlled day schools, and 41,372 in standard university courses. The census of 1931 showed that 21.3 percent of rural boys, 30.2 percent of rural girls, 43.7 percent of urban boys, and 38.9 percent of urban girls, fifteen to nineteen years of age inclusive, were attending school (359). All provinces except Quebec have compulsory education. Separate school systems are provided for in Quebec, Ontario, Saskatchewan, and Alberta (370, 372).

The eighth-grade elementary school and a three- or four-year high school formed the typical organization during the nineteenth century, but in recent years there has been a tendency in the West to adopt the 6-3-3 plan (361, 370). The province of Quebec and two cities of Ontario have made seven years the elementary-school period.

There is marked uniformity in the curriculum of the elementary school throughout English speaking Canada. To the one-time three-R program have been added geography, history, civics, music, art, health, and in Grades VII and VIII, geometry, algebra, and science (354, 359). Despite progress made in establishing industrial arts and technical courses, the traditional academic subjects and preparatory aim still dominate secondary education (368). Except in the Catholic schools of Quebec, extended provision has been made for options beyond Grade IX, but Canadian secondary schools have been tardy in recognizing the claims of the élite in other than professional pursuits (360, 368, 369). This has been attributed to the influence of university admission requirements on state secondary-school examinations (361, 369). The formation of provincial examination boards representative of university and secondary-school interests, and the accrediting of well-equipped secondary schools in Western Canada, promise a greater degree of articulation between secondary and university education. However, much remains to be accomplished before the non-academic elements in the secondary curriculum will have received due recognition.

Teacher training—The desire for well-qualified teachers, expressed in the first piece of Canadian school legislation in 1766, has been voiced by leaders throughout our school history (369, 370). Normal schools, set apart from the system, were established as soon as a provincial organization began to take form. Periodically the training has been strengthened, and in recent years that for candidates holding degrees has been transferred to the universities. Provincial governments have always guarded the standards of training for and the certification of teachers. In all probability they will continue so to do long after other responsibilities have been delegated to local administrative units.

CHAPTER II

History of Education in Europe

A. HISTORY OF EDUCATION IN ENGLAND

General Historical Accounts

A COMPREHENSIVE, GENERAL HISTORY of education in England has not been written. Perhaps Adamson's *Short History of Education* (379) is the nearest approach to a comprehensive account of the development of English educational institutions. Relatively brief treatments of most phases of English educational history may be found in a number of general texts such as those of Cubberley (388), Reisner (433, 434), and Eby and Arrowood (391).

There are a number of authors whose works cover, in a general way, certain definite periods. For the period since 1789, a volume by Adamson (378) is indispensable. The author traced the development of the educational structure through legislative enactment and showed in considerable detail the effect of social change on educational policy. Practically all phases of education were considered. De Montmorency's treatment (389) of the history of the relation of the state to education from the earliest times to 1833 is old but still useful. It is particularly valuable for an understanding of the English common law relating to education and for the history of educational legislation. It should be supplemented by Balfour's excellent summary of educational legislation (382). Balfour's work also serves as a general account of the major lines of development in English education during the nineteenth century. For the whole of the eighteenth and the first half of the nineteenth century, Dobbs's scholarly treatment (390) of education as influenced by social movements is very valuable. Brebner (386) discussed briefly the development of English education since about 1800 with special emphasis on the educational implications of social change. Those who want a short, concise account of the history of English education since about 1860, with references to larger works, will find the two small volumes of Ward (439, 440) helpful. Two encyclopedias of education, one edited by Watson (442) and the other by Monroe (424), contain a great mass of information on various phases of English educational history. A volume edited by Wilson (445), although containing little strictly historical material, is mentioned here because of its value in giving one a general overview of the existing educational institutions of England.

History of Elementary Education

There are a number of histories of elementary education in England. The most recent and perhaps the most valuable of these is the volume by Smith (435). Birchenough (385) traced the evolution of the modern state

system of elementary education, giving an account of changes in the curriculum and internal organization of the elementary schools, and treated in some detail the history of teacher education. Older and less valuable studies in the history of elementary education are those of Adams (376), Holman (407), Greenough (405), and Prideaux (431). Matthew Arnold's *Reports on Elementary Schools 1852-1882* (381) is an extremely useful source of information. Some interest attaches to Lochhead's discussion (415) of the background of present methods of teaching young children. The work and influence of Lancaster and of the British and Foreign School Society was interestingly treated by Binns (384). Jones's volume (409) on the training of teachers is valuable both for its historical treatment and for its analysis of current problems.

History of Secondary Education

Until about two decades ago, there was no reliable, systematic account of the history of the schools of Medieval England. In 1915 Leach (414) published the first comprehensive, scholarly history of English schools before the Reformation. It is not too much to say that Leach's investigation revolutionized the prevailing conception of education in England during the Middle Ages. He showed clearly that grammar schools were far more usual in that period than had commonly been supposed. Leach's work should be supplemented by Parry's more recent history of education in the Middle Ages (430). The two authors, it should be pointed out, are not in complete agreement. Leach's study (413) of education in the reigns of Henry VIII and Edward VI is indispensable for an understanding of the effects of the Reformation on the schools of England. Leach (412) has also compiled the salient documents illustrating the development and conduct of English educational institutions. The great majority of the documents relate to the period before 1550. The report of the Schools Inquiry Commission (404), prepared in 1868, contains a vast amount of information concerning the old grammar schools.

Shortly after the reign of Edward VI, there was a marked tendency to found new grammar schools to offset the losses occasioned by the policies of Henry and Edward. The movement to establish endowed secondary schools in the reign of Elizabeth was traced in detail by Stowe (436), who discussed the foundation and support of new schools and described their government, their teaching staffs, their curriculums, and the school life of their pupils. For an account of the curriculums and internal practices of the grammar schools in the sixteenth and seventeenth centuries, one should consult Watson's detailed and thorough study (443). The author of a more recent volume attempts to give "a comprehensive account, at once readable and accurate, of the conditions prevailing in the Grammar Schools, more particularly during the second half of the sixteenth century, with special emphasis on the human side" (387). Woodward's (449) and Mullinger's (425) discussions of secondary education in the sixteenth and seventeenth centuries are also valuable.

A recent volume by McLachlan (417) treated a neglected phase of the history of English education, namely, the work and influence of the dissenting academies. Attention was directed to the rise of the academies, their character, scholarship, curriculums, textbooks, and the like. Parker's older work (429) on the contribution of Puritanism to education should also be mentioned in this connection.

The most comprehensive and readable account of secondary education since the opening of the nineteenth century is that of Archer (380). He stressed the influence of intellectual and social movements in secondary education; appraised the work of individual endeavor as represented by such leaders as Matthew Arnold, Ruskin, and Kingsley; and traced the increasing participation of the state in the field of higher education. Norwood and Hope (428) treated briefly the history of secondary education. A considerable portion of Kandel's scholarly *History of Secondary Education* (411) was devoted to England and more particularly to the eighteenth and nineteenth centuries. Matthews (423) traced illuminatingly the history of the relation of the Board of Education to post-primary education as carried on in the elementary, secondary, and technical schools.

Higher Education

For the early history of Oxford and Cambridge, the general reader will find Rashdall's monumental study (432) the most valuable. Haskins' account (406) of the rise of the universities is not confined to English institutions but contains a good deal of material relating to them. It is a most fascinating description of the inner life of the early universities with emphasis on such matters as student activities, studies, and textbooks, methods of teaching, and examinations. Vaughn's treatment (437) of the origin and development of Oxford and Cambridge to the close of the thirteenth century is old but still of value. Irsay (408), in his excellent history of universities, devoted considerable attention to English institutions. Short but readable accounts of the history of the older universities may be found in various volumes of the *Cambridge History of English Literature* by Walker (438), Woodward (449), and Adamson (377). Mansbridge (421) has written a relatively short general history of the two older universities, showing in particular how they have made adjustments to the demands of national life through the admission of women and extra-mural teaching.

The first comprehensive and critical history of Oxford to appear was that by Lyte (416), published in 1886. It traced the development of Oxford through the first third of the sixteenth century. Mallet's three-volume history (419) of Oxford, which he began to publish in 1924 and which is now complete, is the most exhaustive and scholarly treatment of the subject. For some purposes the old work by Wood (448) is still valuable as is also the volume by Wells (444). The standard history of Cambridge is the three-volume work of Mullinger (427). A short volume by the same author is a good outline of the history of Cambridge to about 1885 (426).

Winstanley (446, 447) published two valuable books dealing with certain aspects of the history of Cambridge during the eighteenth century. Bellot's recent history (383) of University College, London, is excellent.

For the other universities one should consult the historical notices of the *Yearbook of the Universities of the Empire* (451). The histories of the individual colleges of the various universities are too numerous to be mentioned here.

Attention should be called to MacLean's treatment (418) of the tendencies in higher education in England during the closing years of the nineteenth and the early years of the present century. This work is of particular interest because of its emphasis on the rise and influence of the municipal universities. For an account of adult education, one should consult the studies by Mansbridge (420, 422).

Sources of the History of Education

The reports of the Board of Education (393) issued annually since 1899 are indispensable to the student of education in England. They contain statistical data and a record of events relating to practically all departments of public education. Not infrequently they contain more or less detailed studies of some particular phase of education. The report for 1908-09, for example, carries a summary of the history of secondary education down to 1902; the report for 1923-24 has a section on the recent development of secondary schools; and in the report for 1912-13 there is a detailed account of the history of the training of teachers. The Board also publishes a series of educational pamphlets which cover a great variety of topics. From time to time the Consultative Committee of the Board issues reports of paramount value. Two of these are indispensable for an understanding of recent developments of educational policy. The first of these is the report on *The Education of the Adolescent* (395), published in 1926; the second, *The Primary School* (396), is a complete report on the education of children from seven to eleven years of age. The *Special Reports on Educational Subjects* (394), initiated by Sir Michael Sadler in 1896-97, contain a storehouse of information which no serious student can overlook.

The richest body of source materials for the history of education in England is to be found in the numerous and voluminous reports of the various commissions appointed to investigate some aspect of the educational system. Among these reports the following are the most valuable: report of Her Majesty's Commissioners Appointed to Inquire into the Revenue and Management of Certain Colleges and Schools (392); report of the Commission to Inquire into the Present State of Popular Education in England (397); report from the Select Committee on Education (398); report from the Select Committee on the Education of the Lower Orders (399); report from the Select Committee on the Education of the Lower Orders in the Metropolis (400); a digest of parochial returns made to

the Select Committee Appointed to Inquire into the Education of the Poor (401); reports of the Commissioners Appointed to Inquire into the Working of the Elementary Education Acts, England and Wales (402); report of the Royal Commission on Secondary Education (403); and the report of the Schools Inquiry Commission (404).

Finally, mention should be made of two other extremely valuable sources of information, one the annual *Year Book of Education* (450), issued under the editorship of Lord Eustace Percy, and the other the *Educational Yearbook of the International Institute of Teachers College, Columbia University* (410).

B. HISTORY OF EDUCATION IN FRANCE

Research in the history of education suffers in France from the disadvantage that the subject is not recognized as a university study and to the best of the writer's knowledge there is nowhere in French universities a chair in the subject. Only in the preparation of elementary-school teachers is the study of the history of education required; but at this level the courses are somewhat rudimentary. Despite this disadvantage, which means an absence of continuity and the persistence of undeveloped sections in the history of French education, important contributions had already been made in the nineteenth century and particularly since Gabriel Compayré published his notable works (462, 463, 464). Buisson's encyclopedia (460), of course, contains a mine of information on history of education. In 1906 a Swiss educator, François Guex (473) published a history of education definitely planned to fill certain omissions on French education in German texts and on German education in French texts, and to give more attention than was usually given to education in England and the United States.

But while the history of education has not been fully written up, materials for such history can be found in the codifications of laws and regulations for which Gréard (471, 472) laid the foundations in elementary education and Liard (482) in higher education. On these foundations other works of a similar kind have been developed by Dion (467) and Wissemans (488) in secondary education, and by Schwartz (485) and Soleil (486) in elementary education.

An extensive bibliography on French education which appears in an introduction to the very full and systematic account of French education prepared by the Commission Française pour l'Enquête Carnegie sur les Examens et Concours en France as a part of the International Examinations Inquiry, contains very few references to histories of education (461). Of the histories of elementary education, the majority were written before 1900 (452, 453, 454, 459); for the period up to 1906 the student will find a useful bibliography in Farrington's study (470); a history of elementary education in Paris appeared in 1911 (468); a work on the history of maternal schools was published in 1910 (480). In 1912 there was issued as a series of lectures and discussions on the social sciences of the Ecole

des Hautes Etudes Sociales a volume on the educational conflict in the nineteenth century (458).

The literature on the history of secondary education is even briefer than that for elementary. Here too Farrington's work on secondary education (469) furnishes a good starting point up to 1910. The most important additions since this date are a study of the history of the *baccalauréat* (483) and a history of secondary education from 1802 to 1920 by Weill (487) in which a bibliography of histories of individual secondary schools will be found.

With the exception to be noted, little research has been done in the field of higher education. The standard work by Liard (482) has been supplemented by a detailed study of a brief period by Aulard (455).

The recent celebration of the fiftieth anniversary of the lay school was the occasion for the appearance of two new histories of elementary education. The first by Israël (476) presents a detailed study of the work of Jules Ferry and the conflicts around the proposed legislation for the free, compulsory, and lay school. The second is a monumental work in two volumes by Léaud and Glay (481), which is a complete history of elementary education in France from the dawn of history down to the present. As M. Herriot says in his preface to the two volumes, this work represents "an attempt to place education among the large achievements of history and the essential facts of philosophy which every educator and every cultivated man should possess." The scope of the work is indicated by the full title: *L'Ecole primaire en France: Ses origines—ses différents aspects au cours des siècles—ses luttes—ses victoires—sa mission dans la démocratie*. To this should be added the introductory half-title: *L'Ecole primaire en France: Histoire pittoresque, documentaire, anecdotique de l'école, des maîtres, des écoliers depuis les origines jusqu'à nos jours*. Apart from its contribution as a work of research this two-volume history is remarkable for its illustrations and as a sample of the best type of book production.

A work of great importance which has not received the attention which it merits is the *Histoire des Universités Françaises et Etrangères* (475). For the student of history this work which brings the history of higher education down to 1860 will prove invaluable not merely because of its catholicity but also because of the list of unpublished manuscripts (475:299-302) and an extensive bibliography of about four thousand titles (475:303-97). The analytical index in itself is an excellent guide to the extensive range of topics covered by the author.

A few studies on the history of French education have appeared in English. The outstanding works on the schools of Port Royal are the two volumes by Barnard (456, 457). The works by Reisner (484) and Kandel (477, 478, 479), while not devoted to the history of education in France, contain extensive material on various aspects of the subject. Two other American contributions to our knowledge of the history of education in France are translations with expository introductions by de la Fontanerie of the writings of La Chalotais, Turgot, Diderot, and Condorcet on national

education (466) and of the conduct of schools of Jean Baptiste de la Salle (465). A brief history is included in a recent work on the maternal schools by Hawtrey (474).

C. HISTORY OF EDUCATION IN GERMANY

Scientific research in education has never been given as much scope in Germany as in the United States. There are no chairs of education in German universities; even the leading thinkers in German education—as far as they are university teachers—generally occupy chairs of philosophy and education, which indicates clearly that the theory of education is considered to be closely connected with, or even a part of, philosophy, and much less, if at all, as a “science” like physics or biology. The *Hochschulen für Lehrerbildung* (formerly Pedagogical Academies), being confined to a two-year course for prospective elementary teachers (and, starting this year, to a one-year course for students who want to prepare for secondary teaching), neither their professors of education nor their students find much time for research. Their main objective is teaching and learning, nor are the Academies equipped for large research enterprises. The examination essays of their elementary students are comparable to masters’ theses; few of them venture into the field of research. The *Zentralinstitut für Erziehung und Unterricht* in Berlin sometimes undertook educational investigations, as did the *Auskunftsstelle für Schulwesen*; but the first always considered itself primarily as a clearing-house, and the latter never could go far beyond collecting facts and figures, and disseminating information on the present educational situation. Bureaus of research connected with offices of the public school administration are very rare, and whatever they possess in equipment and means they have to devote to the problems of the day and the locality with which they are associated. The reason for this situation, broadly speaking, is, that education always *has been* and recently consciously and intentionally *is*, considered to be an affair of the *will*; educational endeavors must be directed by *values* and not so much by logical reasoning.

During the last two years there has been a general complaint that the history of education was being neglected in the training of teachers. This may or may not have been true. Judging from the number of publications, however, the historical field seems relatively well cultivated compared with other parts of the science of education. If publications advocating some educational reorganization are excluded, or the giving of practical suggestions and helps for teaching, about four out of five educational books and articles deal with the history of education. Quite a number of them may be termed the result of research; this explains why the bibliography is rather extensive.

Owing to limitation of space a selection had to be made in the list which follows. A complete bibliography on the history of education is included in Hoffmann (556), and a rather extensive and very reliable selection of books, with good annotations to many of them, in Moog (598).

Since historical research in education appears for the first time within the frame of this review the writer has thought it advisable to include as part one the standard accounts of the history of education published in Germany. Cyclopedias of education, which, of course, contain a wealth of historical information, and similar reference books, however, are not discussed. Most of them (Schmid, Rein, Roloff, Clausnitzer, and Schwarz) are well known, even in this country.

Standard Works

Moog (598) is at present *the* German history of education. A library limited to one German book in the field, should certainly choose this, and would be relatively well provided with material about any problem for the period treated (modern times) and the region covered (German-speaking Europe). The book is based on original research to an unusual degree, is modern in the best sense of the word, since it deals with education in its connection with the general current of thought as well as with the changing state of civilization and society, and contains excellent bibliographies in general and for the single chapters. Unfortunately it has no chronological tables, and not even alphabetical indexes, which may, however, be added in a second edition. Still more unfortunately, owing to the death of the author, volume one, covering ancient times and the Middle Ages, is never likely to appear.

Eggersdorfer (526) is the standard work on Catholic education; Nohl (609) is liberal in attitude; a comparable recent book written from the Protestant point of view is not available. Krieck (574), the most prominent National-Socialist educator, stressed the type-forming institutions (not only the educational) and ways of life of the various ages and nations. Barth (496) indicated in his title the point of view of his book; Stein (656) and, in some way, Heubaum (554) are forerunners of Barth; the latter is a disciple of Dilthey and applies his method of "understanding" to the subject. Leser (583) conceived of the history of education as the development of ideas and ideals. Raumer (621), Schmid (634), and Schmidt (636) are "classics," somewhat primitive in their historical method (biographical, teleological, even theological), out of date in many respects, but still valuable as rich in material. Messer (593) is a handy compilation, standing on the borderline between this and the following group.

Handbooks, Textbooks, Outlines

Abb (489), Burckhardt (512), Hehlmann (550) Kynast (579), and Weimer (668) are outlines, useful for the reader who desires a short general survey of the field. Willmann (674), in his first volume, described the historic types of educational systems. Göttler (543), Schiller (633), and Ziegler (683) are handbooks for the university student of secondary education. Krieg (576), Sturm (658), and Wickert (673) are textbooks intended primarily for the former elementary teacher-training institutions (*Lehrer-*

seminare). Krieck (575) was written for the *Hochschulen für Lehrerbildung* (teachers colleges). Abb (489), Behn (499), Göttler (543), Krieg (576), and Willmann (674) presented the Catholic point of view. Behn (499) adopted a rather original scheme by distinguishing between the "classical," the "romantic," and the "modern" viewpoints with regard to each problem. Sturm (658) covered only the twentieth century.

Source Materials

The number of the single works contained in the series of editions referred to in this part being very large, it is impossible to enumerate them here; moreover those published before 1928 are included in the bibliography in Moog (598). More recent works of particular importance are included below. Special attention should be given to two publications really monumental in character, the *Monumenta* (597) and the great edition of Pestalozzi's complete works (615). The first contains, among others, the famous *Pestalozzi Bibliographie* by A. Israel (volumes 25, 29, 31; 1903-05); the latter is prepared with utmost scientific care by the best experts in the field, and has already contributed a wealth of new and reliable information on the life and work of the great Swiss *Praeceptor Mundi*.

Special Fields, Problems, and Individual Educators

In this part of the bibliography it was possible to include only important publications; this is especially true for books and articles published previous to about 1925.

A considerable number of investigations have been devoted to prominent educators of the past; obviously the biographic method still exercises a certain influence. Buchenau and others (511); Dejung (516); Delekat (517), which is an excellent monograph stressing the religious aspect of Pestalozzi's ideas and work; Feilchenfeld (529, 530); Haller (549), somewhat popular; Medicus (590); U. Pretzel (619); Schönebaum (640), who is one of the experts on Pestalozzi; Silber (649); Wernecke (671); Zander (681); and others (614) are devoted to the great Swiss educator. Some of these studies owe their publication to the Pestalozzi centenary in 1927.

Several studies on Wilhelm von Humboldt by Gloege (541), Grube (547), and Rüdiger (627) supplement the fundamental study by Spranger (653) and contribute to the historical side of the great problem—state, church, and education.

Among other educators, Froebel (548, 625) and Herder (500, 622) are represented twice; they arouse some present interest because of their romantic attitude, which appeals to some contemporary thinkers in education. Pauls (612) investigated Luther's educational ideas with a view to strengthening Protestant tendencies, endangered by modern political developments. Schröteler (643) was very active in defending the Catholic viewpoint. Lochmüller (586) gave an interesting biography of Hans Schemm.

(Compare remarks on page 394.) Bosshart (507) analyzed Spranger's ideas on education. Saupe's study (631) contained monographs on thirty-five more modern educators (W. Rein, O. Willmann, E. Meumann, H. Gaudig, H. Lietz, B. Otto, F. Paulsen, E. Spranger, G. Kerschensteiner, E. Kriek, P. Petersen, W. Stern, etc.). Andreesen (495), Fritzsche (537), Gerlach (539), Metzler (594), Seiler (647), and Sellmayr (648) studied individual educators of more or less general importance.

The relations of the state to education is an important topic with Vasconcellos (662) and Pokrandt (616), who dealt with the restoration of Prussia after 1807. J. F. Meyer (596) showed how the political reaction of 1840-70 damaged the elementary school, whereas Foerster (535) and Rosin (626) dealt with a happier period in Prussian educational history (after 1871). Kosler (573) is of particular interest, because he investigated Prussian educational policies in a bilingual region mainly of Catholic character (Upper Silesia), where the relations between the state and the church were somewhat tense. This relation itself is the main topic of Albrecht (490) Dackweiler (514), and Waag (665). Schemm and others (632), Seelhof (646), and Stark (655) viewed education from the National-Socialist point of view.

A large number of studies are devoted to specific periods. Of particular interest among them are the following: Eichler (527); Gleich (540); Götze (544), one of the very rare contributions to the history of adult education in Germany; Iven (559); and Knauth (572), mainly because of the relation of their topics to present-day problems. The latter is especially true for Keilhacker (568) and Wüllenweber (679), who investigated the field of old German education which was much neglected until recently. Jaeger's study (560) is a monumental work of high standing. Marx (589) and Stahl (654) throw some light on subjects on which very little was known heretofore.

As to the history of the educational developments since 1900 and in most recent times, special attention may be called to the general surveys by Hierl (555), Nohl (608), Riedel (624), Deiters (515), and Fischl (534); to Spranger's essays (650, 651); then to some studies on the socialist movement in education, by Breitenstein (508), Liedloff (584), Weise (669), and Wittenberg (677); and to an interesting effort of penetrating into a problem which was of paramount importance in the republican period of Germany, by Netzer (603). Careful and reliable surveys of the present developments are given by Wenke (670).

Not very numerous are studies of foreign education and international relations and their educational implications in Germany, like those by Eberhard (524), E. Lehmann (581), and Schröteler (642, 644).

The history of specific types of schools is dealt with by C. Müller (599); Heinemann (551); Wychgram (680), rather old but still important; Paulsen (613), one of the finest achievements of German scholarship in the field; and Rethwisch (623). University problems were treated by Nabakowsky (602) and Schmidhauser (635).

From the large number of historical studies on certain regions or single institutions only a few of the most typical ones are noted here: Bastian (497), Blinckmann (504), Clemenz (513), Krumbholz (577), Kuckhoff (578), G. Meyer (595), G. Müller (600), Wetzel (672), and Winkler (676).

Specific phases of the educational field were studied by Böhme (505), Kielhauser (569), and Neuendorff (606), a work of monumental character. In this connection Kehr and others (567) may be mentioned as somewhat unique in topic and thoroughness.

This brief survey cannot conclude without mentioning four books which deal with the history of the educational profession, namely Fischer (533), Mellmann (592), Murtfeld (601), and C. Pretzel (618), the latter being an excellent history of the German Elementary Teachers' Association (Deutscher Lehrerverein), which itself made history by being one of the first and certainly most successful teachers organizations of genuine professional character in the world.

Method of Historiography and Historical Research in Education and Bibliography

The method of historiography and consequently of historical research in education has undergone a far-reaching change during the last five or six decades. A brief account of its development was given by Thiele (660). Out of a history of systems, theories, methods, and personalities (until 1870) grew a history of "educational reality" (until 1914), the latter term being applied almost exclusively to schools and related institutions. Since the World War, however, education has been conceived more and more clearly to include a much wider field; and educational history since this time, is gradually broadening out into cultural history (Bildungsgeschichte), including all the influences molding the oncoming, and even the present, generation. Dolch (521) surveyed the field from a somewhat different point of view, distinguishing between the history of facts, doctrines, "heroes" (great educators), and "thinkers" in education. Hoffmann's study (556) contains a comprehensive bibliography, including all books and articles in German; those on history of education are organized into three groups: (a) general accounts, including bibliography and convention records; (b) history of single institutions or regions; and (c) single personalities (works, monographs). Scientific libraries should not dispense with this serial. Spranger (651) and Schneider (637, 638) discussed general problems of research in the history of cultural (geisteswissenschaftlich) subjects, the former's investigation being of a very immediate interest with regard to that present current of thought which denies to science the right to stipulate its own presuppositions.

For this section compare also Brunnengräber (510).

Periodicals

By far the most important periodical in this field is the *Zeitschrift* (682), published by the Gesellschaft für deutsche Erziehungs- und Schulgeschichte

which edits the *Monumenta* (597), and contains a wealth of material, partly supplementary in character to the latter. Until about 1933 all the educational magazines devoted some of their space to history of education; under the pressure of the present situation, however, which calls the attention of the educational world in Germany to the needs of the day, historical topics have been pushed to the background; moreover a number of periodicals have been discontinued. For these reasons the list of periodicals is short. *Bildung und Erziehung* (503) is a Catholic publication. *Deutsches Bildungswesen* (519), founded by the late Hans Schemm, National-Socialist minister of education in Bavaria, and leader of the National-Socialist Teachers' League, is the League's official publication of a more scientific character; thus historical articles published in it have a specific interest so far as they apply the National-Socialist idea of "rewriting the history of the past" to the history of education. *Die Deutsche Schule* (518) was formerly the leading periodical of the Deutsche Lehrerverein; its older volumes contain many excellent historical studies. *Die Erziehung* (528) is a "free" periodical, since it has no connection with any league or association, and is of very high standing. Its character changed little after 1933. The articles of Wenke (670) furnish very valuable material for the historian of education. *Volk im Werden* (664), also independent of associations or groups, is the National-Socialist periodical of similar standing; while it does not definitely exclude historical studies, it devotes most of its space to present-day problems.

Publications in English

A history of German education written in English, to the writer's knowledge does not exist. Valuable historical material for the period from 1924 to the present day is to be found in Kandel (563). Kandel (562) also gives brief historical summaries on various problems for Germany as well as for the other countries covered. As to the other books, the titles speak for themselves (491, 492, 493, 498, 509, 545, 564, 565, 566, 588, 628).

D. HISTORY OF EDUCATION IN ITALY

As in France, the study of the history of education in Italy is confined in the main to the requirements for the preparation of teachers; there do not exist, as in Germany, centers for the promotion of research in this field. Hence the majority of the publications are in the form of textbooks with occasional research studies in special fields pursued by individual scholars. Adequate attention has not been given to the history of education in Italy which, particularly during the nineteenth century, represents a struggle toward a national philosophy of education finding its culmination in the work of Croce and Gentile. The history since the emergence of Fascism represents a further stage in this development with the domination of Fascist political ideology over the philosophic trend.

The contributions to the history of education may be divided into three groups. In the first are the textbooks for the use of students with the inclu-

sion generally of sections on the history of education in Italy. The second group consists of research studies in Italian history of education. The third includes studies on special aspects of education.

The textbooks differ somewhat from those which have appeared in English to the extent that they draw more on research done in the field in England, France, Germany, and the United States, as well as Italy. A good example of this type of book is found in the two small volumes by Pietrosi (710). Some textbooks, like that of De Domenicis (696), include brief extracts from source materials. Since the books in this group in general present the type of content found in most textbooks it is unnecessary to do more than list them (684, 686, 688, 689, 695, 698, 706, 707, 708, 713, 714.).

The second group of books is devoted to research studies in general and special aspects of education in Italy. The volume *Pedagogia in the Enciclopedia delle Enciclopedie* (697) contains, outside of materials which would naturally be expected, important contributions to the history of education which might otherwise be overlooked. The history of the philosophy of education in Italy during the nineteenth century is presented in an article under the title "Pedagogia Spiritualista Italiana del Secolo XIX" (697:1250-88). A series of articles on educational thought in the literature of France, England, Italy, Spain, and Germany presents a novel and highly important approach to the study of educational thought (697:1288-1332). A long article is devoted also to the history of education in Italy during the eighteenth and nineteenth centuries (697:1586-1649).

Studies in the history of education in the Italian states have dealt with Piedmont (705), the Duchy of Este (700), the pontifical State (699), and Naples (717). A history of education in Italy in the second half of the nineteenth century has been developed in a work by Formiggini-Santamaria (701), and an account of the educational theorists of Italy up to 1900 has been presented by Gerini (702). A general history of elementary education by Angeli (685) appeared in 1908, and was followed ten years later by Castagnola's history of modern educational theory in Italy (690). The recent development of nursery schools in Italy is the subject of a brief study by Lombardo-Radice (703).

The progress of education under the Fascist régime was discussed by Spirito (712) in the *Educational Yearbook*, 1924. The philosophy underlying education in Italy was discussed in detail in the *Educational Yearbook*, 1929 by Codignola (694). Codignola has contributed other articles to the *Educational Yearbook* on the expansion of secondary education in Italy (691), on the relation of the state to religious education in Italy (692), and on teachers associations in Italy (693). The *Educational Yearbook*, 1931, contains an article by Malvezzi de'Medici (704) on native education in the Italian colonies.

Among special topics which have been studied may be mentioned the following: the relations of the state to public education in the Roman Empire (687); public education in the French Revolution (716); and three studies on the history of physical education (709, 711, 715).

E. HISTORY OF EDUCATION IN THE SCANDINAVIAN COUNTRIES

Research in the history of education in the Scandinavian countries is a comparatively virgin field; in English particularly, very few publications have been issued. Several studies deal with some phase of education in each of the Scandinavian countries, but even in them gaps are numerous; the history of education is incidental and is generally discussed in a mere outline of the historical background of the particular phase. However, from time to time, brief general accounts of the contemporary status of education have been written for each country. In studies such as Abel's (718, 719), the student of the history of education will frequently find authoritative statements of a comparative nature giving the relative position on some educational problem of Scandinavia or of one of its parts, together with references to problems of other countries.

In its section on comparative education, the *Year Book of Education* for 1936 (724) gave excellent brief accounts of the historical background of education for each country. Pearson (723) and Thornton (725) presented material of historical interest representing the educational status of the time covered. Bibliographical material for each country is furnished by the International Bureau of Education (721) and Turosienski (726). Paludan (722) gave a comparative historical presentation in Danish of secondary education in Denmark and Sweden.

Denmark

Boje and others (730) presented a comprehensive view of Danish popular education and its development during the nineteenth and twentieth centuries. Besides elementary and secondary schools, there was included a discussion about agencies for adult education, associations for young people, libraries, broadcasting, etc. Knight (747) reported observations and impressions of various educational and cultural agencies from a visit in Denmark during 1925 and 1926.

Several brief general accounts of Danish education, many of which include some historical data and which are of value as indicating trends and movements prominent at the time they were written, have been published (727, 729, 737, 741, 744, 752, 757, 761). Of these, the works by Foght (737), Hegland (744), Rost (757), and Arnett and Smith (727), have sections devoted to historical development.

Most educational studies on Denmark deal with the folk high school. Good, comparatively recent studies are those of Begtrup and others (728), Cabot (731), Campbell (732), Davies (733), and Hart (743). Studies of a somewhat earlier date include those of Foght (736, 738), Friend (742), Hegland (744), and Marais (751). The reports by Foght (736) and Friend (742) were the result of studies made in Denmark during the winter and spring of 1913. The former is a comprehensive study of the folk high school and includes a chapter on its historical evolution; the latter is a description of the work and methods of the folk high school and in-

cludes a historical sketch. Among Danish works on the folk high school, that of L. C. Nielsen (754) gives the letters and lectures of one of the early pioneers of the movement; that of Rasmussen (756) information concerning the status of the folk high schools in 1896; while that of Schröder (758), published in 1905, is a contribution to the history of the folk high schools. Hollmann (746) presented a German view of the folk high school.

Foght's educational survey of Denmark (738) is the first of a series of reports on rural education in Denmark issued by the United States Office of Education in 1914-15. The other issues of the series are bulletins by Foght (735, 736) and Friend (742). The series, together with the bulletin by Hegland (744), gives a rather complete picture of the educational system of rural Denmark as it was at the time of its publication.

Chapter nine of De Gibon's work (734), which is written in French, adds to the picture by bringing the story to 1928, and furnishing for rural education a setting against a background of the main development and problems of the agricultural system of the country as a whole.

Studies by Forchhammer (739, 740) and Hart (743) dealt with special phases of education; that by J. Nielsen (753) was devoted to teachers associations, including their historical development; and that by Lindegren (750), after a brief statement about the organization of education in Denmark in preparation for admission to college, gave a factual account of the institutions of higher education in Denmark. To a student of educational hygiene, the work of Hertel (745), published in 1885, is of historical interest. Out of several monographs on the same subject, Hertel's was selected for re-publication in English because of the conviction on the part of those in charge that it was "an eminently careful and scientific treatise," placing "in a clear light the dangers and difficulties" which beset the educational enterprises of the day.

Among publications in Danish, two by Larsen (748, 749) definitely represent research in history of education. Part one of *Bidrag til den Danske Folkeskoles Historie, 1784-1898* (748) dealt with the history of the development of the elementary school in Denmark from 1784 to 1818; part two continued the story to 1898. *Den Danske Folkeskoles Historie* (749) is a history of the elementary school in Denmark prepared especially for teacher-training seminaries. The work of Thomassen (760), published in 1896, is a bibliography of Danish pedagogical literature.

Norway

A good idea of the organization, management, and operation of the educational system of Norway may be obtained from Anderson (764). Other accounts include those by French (772, 773), Gade (774), Knap (778), Sigmund (781), and Smith (782).

Special studies in secondary education include two by Anderssen (766, 767), one of which (766) is a discussion of the law of 1896; the other (767), a centennial publication in Danish covering the period 1814-1914;

and one by Loftfield (780), published in 1930, and which still remains the most complete and authoritative study in English on secondary education in Norway. Supplemental to this in the field of higher education is a bulletin by Lindegren (779).

Part two of Jensen's *The Rural Schools of Norway* (777) is an account of the historical evolution of the rural elementary school in Norway. The chapter in the *Educational Yearbook of the International Institute* by Askeland and others (769) is a study of the historical development of state regulations governing the various types of private education in Norway. Studies which discuss special phases of education are those by Anderssen (765), Askeland and others (769), Bjanes (770), and Helgesen (776).

Studies in Norwegian include one by Voss (783) which dealt with the educational struggle in Norway during the nineteenth century, with special references to the regulations of 1809, 1869, and 1896; and one by Feragen (771), a treatise on elementary education.

The appendix of Jensen's work (777:253-80) contains a bibliography of Norwegian pedagogical literature prepared by the staff of the Library of the University of Norway. Other valuable bibliographies in the studies listed are found in works by Anderson (764), Arent (768), French (773), Helgesen (776), Jensen (777), Lindegren (779), Loftfield (780), Smith (782), and Voss (783).

Sweden

Three good general accounts of recent date on education in Sweden have been published, two by Bergqvist (788, 789), formerly head of the Swedish Royal Board of Education, and one by Coles (792). The account by Lindström (803) is good for the period of 1913 in which it was written. It includes a bibliography and a brief historical account.

There are a number of studies on special phases of Swedish education which, when taken together, give a fairly good picture of the educational situation. Most of the accounts include some material on the historical development of the main theme. Among these studies are those by Bogoslovsky (790), which dealt with the national, political, and social background of Swedish education and which contain a brief historical survey of the movement for educational reform in Sweden; Borgeson (791), which dealt with elementary and secondary education previous to the reform of 1927; Coles (793), which is the best account in English of that reform; Peterson (805), a descriptive study of the training of elementary- and secondary-school teachers; Kilander (800), an interesting study on science education in the secondary schools; Lindegren (802), a study of institutions of higher education; and the Swedish Overseas Institute (821), which deals with higher professional education.

Special phases of education in Sweden, such as the folk high school, school hygiene, and teachers associations, have been studied by Jonsson (799), the Royal Swedish Committee for the Second International Congress on School Hygiene (807), and Malmberg (804). An official publica-

tion (787) gave an account of the reorganization of education in Sweden through the reforms of 1918 and 1927, and a work by Lagerstedt (801), also a Swedish publication, gave an account prepared in 1920 for the Eleventh Nordic School Meeting held in Christiania and covering the years 1910-20. The eleven official reports (807, 811 to 820 inclusive) represented the findings of committees appointed to investigate various phases and problems connected with education. Each committee was interested in the historical development of its problem and made some mention of this in its report. The committee on the elementary-school seminaries (812) devoted volume three of its four-volume report to a historical account of the development of the seminaries for the training of elementary teachers.

Among other studies in Swedish dealing with some period in the history of education, are those by Warne (822), which deals with the pre-history of the elementary school in Sweden; Westling (823), which is a treatise on the Swedish elementary school after 1842; and Rietz (806), which is a history of education in one of the well-known counties of Sweden.

CHAPTER III

Comparative Education

COMPARATIVE EDUCATION is a relatively recent arrival among the increasing number of branches which make up the professional study of education. Although it is a recent arrival as an organized branch, the study of what other nations have done in education is considerably older. One need only recall the influence in France and in the United States of Victor Cousin's *Report on Education in Prussia*, or of the reports of Calvin Stowe, Horace Mann, and others, on the development of education in this country, or the mine of information on foreign educational practices in Barnard's *American Journal of Education* and later in the reports and bulletins of the United States Bureau of Education, or finally, the reports of Matthew Arnold and the monumental *Special Reports*, initiated by Sir Michael Sadler and published by the Board of Education in England. The articles on educational systems of foreign countries throughout the world which appeared in Monroe's *Cyclopedia of Education* (1934) just before the World War may be said to mark the culmination of an era.

The study of foreign school systems in the past twenty years may definitely be described as the natural outcome of two forces—first, the unrest in education caused by the upheaval of the World War, and second, the expansion and redefinition of the scope of the study of education. Immediately after the outbreak of the War the participating nations began to survey the strong and weak points of their own educational systems and to compare them with those of other nations. The result of the new demands placed upon education in the period of reorganization, already planned during the War, was a search for new philosophies and new methods of approach to the problems of education which confronted both educators and statesmen. There has thus developed a widespread interest and an extensive literature in comparative education.

From the point of view of this monograph, however, a discussion of research in comparative education is surrounded by a number of difficulties. As contrasted with educational psychology and its allied branches there is, first, no unanimity about the methods of research. In the main it may be said that the methods of comparative education are similar to those used in research in the fields of history and philosophy of education. Indeed, comparative education has for its field the study of contemporary history and philosophies, and the best preparation for research in comparative education is preparation in the methods of historical research and in philosophy in the broadest sense of the term. Secondly, there is no agreement or concerted drive on the topics to be studied; their selection depends upon the peculiar interest and equipment of the inquirer. Finally, the field is so broad and goes so deeply into the roots of national existence

that few inquirers have the equipment which demands not merely an interest in and knowledge of all the phases of education but of all the social, political, and cultural backgrounds that give education its meaning, as well as a knowledge of foreign languages which will give access to these backgrounds. One thing is clear and that is that the mere study of educational practices or theories in isolation, of methods, of curriculums, of courses of study, of time schedules, of administration and organization, and of statistics has no meaning except in the light of such backgrounds, the possession of which is too often taken for granted even in the study of the educational system of one's own country. An excellent illustration of the thesis that no problem in education can be understood without going back to the roots from which it springs was provided in the discussions of the problem of examinations which were held at Eastbourne, England, in 1931. There were present at this conference representatives from England, Scotland, France, Germany, Switzerland, and the United States. The discussions of the examination problem inevitably led to a discussion of the type of education to be examined, and, although the discussions were not prepared in advance, the *Report of the Conference on Examinations* (870) which recorded the proceedings at Eastbourne, constitutes the best illustration of differences between national systems of education that can be found anywhere. It is because of failure to go into the fundamental bases that so many studies of education in foreign countries give but the skeletons of the systems without making that contribution which comparative education should furnish for a practical study of philosophy and principles of education. And this contribution is all the more possible because so many of the problems in education are today common to most countries; in their solution certain common principles or philosophies are involved; the practical outcomes may, however, differ because of differences in tradition, in social and political principles, and in cultural standards.

It is objected sometimes that all that can be secured from a comparative study of educational systems are subjective opinions, the personal judgments of the inquirer himself. There is some truth in this if what is done is to attempt to evaluate the quality of education. But this is not fundamentally the purpose of comparative education, although it may have its place under proper reservations; rather it is to discover what the problems in education are, to discuss how they are met, and to develop a philosophy or outlook on education. Another type of technic is beginning to be used and has possibilities of further development; this is the actual comparison of achievements in different subjects of the curriculums in different countries. Progress with this technic will depend, first, on the improvement of the scientific procedures of measurement, and, second, on a more widespread acceptance of such measures than exists at present.

Statistical comparisons in education are for the present worthless, partly because the methods of collecting data vary from country to country, and partly because of variety of terminology. Statistics of costs of expenditures again have little meaning because of the great divergences in purchasing

power of the currencies used. It is not impossible that some scheme of uniform reporting and accounting may some day be developed and basic index numbers established which will make comparisons practicable. Comparisons are made, for example, between enrolments in high schools in the United States and in secondary schools abroad, ignoring the fact that such schools offer only academic courses in the main and excluding the vast array of other types of differentiated schools for adolescents which are found in most countries.

Despite language handicaps there is an increasing amount of material available in English for the student of comparative education. The specialist, however, can make but little progress without a command of at least two foreign languages. The difficulty is to discover boundaries for what is called the study of education. Books like those of Sieburg, *Who Are These French?* or of Renier, *The English, Are They Human?* or books in the political and social science fields, or current literature may at times be more important for throwing light on the meaning of education in a particular country than the educational system itself. It is from this point of view that the series on Civic Loyalty edited by Merriam and the two volumes by Tugwell and Keyserling (1969) are written; education, in other words, is discussed in its proper setting of national aims and purposes which give meaning to those problems—administration, organization, curriculum, courses of study, methods of instruction, preparation and status of teachers, etc.—with which the professional educator is concerned.

The importance of this method of approach can best be illustrated by considering how educational systems in transition should be studied. There are today numerous examples of such systems—Mexico, China, Turkey, Iraq, Russia, Italy, and Germany, as well as many so-called backward countries which are beginning to plan the provision of educational facilities of a modern type. Merely to describe the present system of education in Italy, for example, or to study the administration of education, the organization of schools, the curriculum and courses of study, the preparation of teachers, and the examinations may be interesting but is meaningless without an intensive study of the political, economic, and cultural significance of Fascism, of the conflicting philosophies which dominated Italy before the advent of Fascism, the philosophy of the school of Croce and Gentile, the educational interpretations of such philosophy by Gentile, Lombardo-Radice, Codignola, and others, the recent history of Italian education which called for reform, the cultural tradition of Italy, the relation of state and church in Italy, and the more recent changes of Fascism itself with its emphasis on power politics, manifested in the educational emphasis on militarism in the schools.

Germany offers an excellent opportunity for the study of educational changes produced by two political revolutions in less than two decades. The educational system of the Republican period, 1918-33, must remain unintelligible without an understanding, first, of the type of education which it displaced and which had been based on a different political

régime, and second, without a study of the Weimar Constitution with its social and political implications, of German character, and of the significance of doctrines of freedom for education. The great variety of experimentation which characterized German education during this period can be understood only in the light of a change in the philosophy governing the relation of the state to the individual. Such a study, including the impact on politics and education of the economic situation, gives the proper perspective for an understanding of the National Socialist Revolution, which in turn cannot be understood without going back further into the history in Germany of the conflicts in philosophy and politics between liberalism and totalitarianism. The triumph of the National Socialist Revolution means the restoration of the dominant rights of the state over the individual, which has set its mark on every aspect of education. But beyond this it is necessary to go back to the history of political theory and government in Germany from the days of Frederick the Great in order to appreciate the fact that National Socialist ideology, despite its professions of novelty, is but the culmination of more than a century of conflict between the totalitarian concept and liberal ideals. The study of education in Germany in the last two decades thus offers an excellent opportunity for appreciating the intimate relations between social, political, and general cultural traditions and theories on the one hand and educational theories and practices on the other. Without such a study the mere survey of the framework of the educational system must remain meaningless.

Soviet Russia offers another illustration of the same type. The ideological Revolution in Soviet Russia on which education has been concentrated can again be best understood in the light of Russian traditions and backgrounds which have left a certain impress on the Russian mind. Religious orthodoxy has been replaced by economic orthodoxy; the autocracy of the Czar has been supplanted by the autocracy of the Party; and for political and military nationalism there has been substituted a class consciousness whose influences are much the same. The history of Soviet education represents an attempt through free and uncontrolled experimentation to discover a type of education best suited to the present régime, culminating in recognition and admission of failure and a return to the pre-Revolutionary pattern with only a difference in the content of instruction and different methods of selection through the system.

The interest of the American student in change has been directed in the main to the educational systems of the revolutionary states and has not been devoted to education in those countries in which the tempo of progress is slower and less spectacular. And yet the same methods of research and inquiry are essential for a proper understanding of those countries which have built up strong traditions of culture with a resultant check on hasty changes in established institutions. Here the educational systems of France and England have as much to offer to philosophy of education as have those of the more revolutionary states. The student may well ask why a nation like France, which has set up the cult of reason as the supreme

ideal of the human mind, is still content to have a system of education which apparently lags far behind the times. Here, too, the answer can be found only in a cultural history of over three centuries (to include only the modern period) and in the political history of a century and a half. From the one comes the tradition of *culture générale* and training in clarity and orderliness of ideas; from the other is derived that emphasis on *sécurité d'abord* which explains the desire through education to assure national solidarity. Cutting across both is the individualistic character of the Frenchman which education seeks to harness through its emphasis both on a common culture and on common objects of allegiance.

England, by contrast, appears on the surface to make no effort through education to impress either her traditions or national ideals on the rising generation. There the student finds an interplay between tradition and adaptation to new demands which is so subtle as to escape his attention. There the question is not preparation for an unknown future but, in the words of a president of the Board of Education, "Can we so adjust our system that, without dropping anything essential from our native inheritance, we can go forward confidently to meet the needs of a new world?" There one finds the reconciliation between a doctrine of *laissez faire* and a policy of developing a national system of articulated schools.

The same method of research, an analysis and interpretation of educational systems in the light of national traditions and the current political, social, and economic setting may be applied, not only to younger countries like the British Dominions and the South American nations, but also to the so-called backward peoples of the Near East and in colonial dependencies, often with a rich body of culture which needs to be reshaped to meet modern conditions. In the one group one finds centralized systems which were appropriate for sparsely populated countries; in the other there is beginning to spread the recognition that the imposition of foreign cultures has been a mistake and that the way of progress lies not through assimilation but through adaptation to indigenous cultures and folkways as well as local needs.

It is only as these methods are employed that the student can understand such questions as administration and organization of education, curriculum and methods, and the preparation of teachers. By such methods of research a student can come to a better understanding and appreciation of the meaning of education in his own country, which he is too often apt to take for granted and as a result to devote his attention to the mechanisms and technical aspects of education. Further, this method of approach stresses what is perhaps more important for the American student of education than anything else in face of the danger of too intense specialization—the enrichment of his cultural background and a fuller understanding of the significance of education in its national setting.

One thing comparative education cannot and should not attempt to undertake—i.e., to adopt directly and without the necessary safeguards of modification the theories and practices of other countries. There are today

enough evidences of the failure of such attempts, which in most cases is not a criticism of the theories or practices but rather proof of the thesis which has been emphasized up to this point that educational systems reflect the ethos of their environment and that all that can be transported is the idea to be modified and applied to the ethos of the new environment. The history of the importation of foreign commissions to organize and administer systems of education in part or entirely in many South American countries is a history of failures. This was the burden of the report of the League of Nations' Mission of Educational Experts, entitled *The Reorganisation of Education in China* (925). The experts discovered that the transportation of the American system to China had failed, but went on to commit the same error in recommending that China look to the organization of school administration in the different European countries. The criticism of foreign influences in Persia (954) and in Egypt (832) run along the same lines, while authorities in charge of education in colonial dependencies (910) and those engaged in missionary education (916, 933) are also beginning to realize that education must be adapted to local traditions, culture, and needs. On the other hand the striking reform of education in Mexico shows what can be done by the adaptation of an educational theory to the ethos of a nation (874, 875, 912, 958).

The method of approach here outlined had already been discussed by Sir Michael Sadler, who, as editor of the English Board of Education's series of *Special Reports on Educational Subjects*, may be described as the modern founder of the study of comparative education. It is to be noted that this series was established not merely to promote the academic study of education but to assist the English authorities in deriving as much help as possible from as many sources as possible in the task of reorganizing the system of education. This practice has been continued down to the present, and, in addition to special issues devoted to the study of the educational system of a foreign country or of some special problem, the *Educational Pamphlets* series published by the Board of Education as well as the *Reports* issued from time to time by the Consultative Committee contain some account of foreign practices.

Discussing the value and methods of comparative education Sadler pointed out many years ago (955):

In studying foreign systems of education we should not forget that the things outside the schools matter even more than the things inside the schools, and govern and interpret the things inside. We cannot wander at pleasure among the educational systems of the world, like a child strolling through a garden, and pick off a flower from one bush and some leaves from another, and then expect that if we stick what we have gathered into the soil at home, we shall have a living plant. A national system of education is a living thing, the outcome of forgotten struggles and difficulties and "of battles long ago." It has in it some of the secret workings of national life. It reflects, while seeking to remedy, the failings of national character. By instinct it often lays special emphasis on those parts of training which the national character particularly needs. Not less by instinct, it often shrinks from laying stress on points concerning which bitter dissensions have arisen in former periods of national history. But is it not likely that if we have endeavored, in a sympathetic spirit, to understand the real working of

a foreign system of education, we shall in turn find ourselves better able to enter into the spirit and tradition of our own national education, more sensitive to its unwritten ideals, quicker to catch the signs which mark its growing or fading influence, readier to mark the dangers which threaten it and the subtle workings of hurtful change? The practical value of studying in a right spirit and with scholarly accuracy the working of foreign systems of education is that it will result in our being better fitted to study and understand our own.

The same point of view was expressed by Thurber (967:2) :

There are certain problems set for every people that undertake to deal with school organization. There have been various solutions worked out for these problems, chiefly in the nineteenth century, by different nations, each operating in its own historic spirit and environment. The answers obtained may or may not agree, but our view will be widened by seeing more than one solution. Moreover, such a study, dealing as it does with fundamental principles, should foster the acquisition of a philosophic attitude toward that wide field of interest covered by the term "organization of education". . . . Perhaps, too, we shall see more clearly that education, as a system, is a development, a product of the evolution of society, and that if the form we have seems not quite to fit our highest conceptions, the way to better it is not by bartering what we have for what someone else has, nor by building a lean-to against our present structure. Further study might well be given to the basal problem for each country: how has the existing condition and system or lack of it been developed out of the cooperation and antagonisms of universal principles and national peculiarities?

Thurber sounded a warning against holding up the foreign systems of education as models to be adopted and against that more or less fanatical chauvinism to which "we owe the other common class of allusion to foreign schools which are made for the purpose of showing how immeasurably inferior they are to the native product."

Meaning of Comparative Education

In what sense can such an approach to the study of the educational systems of foreign countries be called comparative? Does comparative education imply the existence of standards of measurement or of comparison? The first answer is that such standards do not yet exist. The second is that at present, at any rate, the purpose of comparative education, as of comparative law, comparative literature, or comparative anatomy, is to discover the differences in the forces and causes that produce differences in educational systems. This is all the more important today since most of the advanced nations are confronted with almost identical problems and yet the solutions are not universally identical. Thus the chief preoccupation in most countries is the problem of the education of the adolescent. All are interested in the American solution of this problem by the provision of equal and identical opportunities of education, but few are disposed to accept this solution in the form of a single comprehensive high school. On the other hand, there can be detected in the United States considerable dissatisfaction with what is called "the waste in secondary education." Other countries are looking for schemes for increasing and enriching the opportunities for the education of the adolescent, but fear that the American solution may militate against the retention of quality in education (908, 909, 914, 926, 958, 968).

More or less objective standards of comparison do exist at this point. Graduates from secondary schools in the leading European countries would be admitted to the junior year in an American college, provided they had an adequate command of English. Such standards are generally accepted, although there is not available any published statement on equivalents. The probability is that age for age the European student is accelerated by two years in advance of the American. This, of course, may point either to a longer secondary education and an earlier start or more careful selection, or it may impel one to inquire whether the American student derives some educational advantages which the European does not possess, and which are of a more practical and worldly rather than intellectualistic character (828, 867, 926, 930).

It is not altogether true, however, that objective comparisons cannot be made. For the present their scope is somewhat limited to the type of measurement that can be conducted through objective tests. Such comparisons have already been conducted. Thus Powers in 1927 administered American tests in chemistry to pupils in a few English secondary schools (949, 950). In 1929 the Educational Records Bureau of New York City tested English secondary-school pupils using American tests in English, French, and algebra (878). In 1931-33 an investigation was undertaken in the County of Fife, Scotland, "at the request of the Scottish Council for Research in Education, which was seeking evidence on two matters: first, the comparison of the standards of achievement in schools of Scotland and America; and second, the applicability of American achievement tests to Scottish pupils." The tests were conducted in reading, arithmetic-computation, arithmetic-reasoning, language usage, and spelling. The results showed that on the level of achievement, Fife "eleven-year-olds" were sixteen months ahead of American children of the same age; in reading they were five months ahead; in arithmetic-computation, twenty months; in arithmetic-reasoning, thirteen months; in language usage, twenty-four months; and in spelling, twenty-nine months. It was found that "group tests of intelligence devised in America are seriously misleading if the norms are not derived from the application of the tests derived in this country [Scotland]" (928).

The application of American tests has also been made elsewhere. They were used in the surveys conducted by the International Institute of Teachers College, Columbia University, under the direction of Monroe, in the Philippine Islands (937) and Puerto Rico (938). Sandiford used American tests as part of the survey of education in British Columbia (957). More recently Superintendent J. F. Cramer of The Dalles, Oregon, has followed up in Australia a comparative study of the achievement of American and Australian children which he had already begun in his own system a few years ago. The results have not yet been published.

The Modern Language Investigation, conducted under the direction of Fife of Columbia University, employed the same series of tests in modern languages in the United States, Canada, and England, which gave a basis

of comparison of the strength and weakness of pupils as measured by a common standard (884).

This method of comparison lends itself to other uses. Thus H. R. Harper in 1931 conducted tests of international attitudes of students in Austria, Czechoslovakia, Denmark, England, France, Germany, Switzerland, and the United States (889). Hauck (892), in a study of American-Canadian relations, used an informational test in order to discover how much the children of one country knew about the other.

The use of objective tests for comparative purposes is promising but probably limited in its scope to the measurement of achievement of facts, knowledge, and information. It is not inconceivable, however, that the time may come when some central agency will be able to devise tests on the basis of courses of study and textbooks from a large number of countries in such forms that they will not be affected by translation into several languages. At the same time they may still remain inadequate because of the difficulty of devising international tests of intelligence against which to measure the results of the achievement tests.

Outside of the field of objective tests the Institute of Intellectual Coöperation of the League of Nations had a study of school texts prepared in the interest of eliminating or correcting references to foreign countries which militate against the development of international understanding (904). A similar study had already been made, but, in the opinion of the writer, rather prematurely, by Prudhommeaux under the auspices of the European branch of the Carnegie Endowment for International Peace (951). The Scandinavian countries through their international organization, Norden, have also agreed to examine textbooks in the interest of better understanding among the four nations—Denmark, Finland, Norway, and Sweden (971). Scott reversed the process and sought in his two studies, *The Menace of Nationalism* (961) and *Patriots in the Making* (962), to discover the cause of international antagonisms.

Another aspect of the same problem—the making of citizens—has been thoroughly treated from the social, political, and other points of view in the series on civic education edited by Merriam (836, 886, 890, 893, 906, 923, 932, 948, 959). This series, while not specifically devoted to education, is invaluable to students of comparative education as an illustration of the methodology appropriate to this field of study. Each volume furnishes an excellent example of the thesis developed earlier that the educational system of a nation cannot be understood fully except as an expression of everything that enters into the creation of that nation's mentality.

The progress of the study of comparative education has been essentially a post-War development due to two causes: The first has been the desire to obtain as broad a knowledge as possible of foreign school systems and theories as the basis for the educational reconstruction which has taken place everywhere. The second has been the increase in the number of international organizations interested in the exchange of educational ideas and in cooperative attack on some educational problems. The League of Na-

tions, while at first remaining aloof from the consideration of education as the proper concern of each nation alone, has through some of its organizations undertaken the study of some common problems that affect all countries. Thus the International Labor Office has stimulated a revision of the laws of compulsory school attendance in many countries as a measure for the protection of children against economic exploitation. Another division, the Institute of Intellectual Coöperation, with its office in Paris, considered the careful analysis of school textbooks in the interest of peace by the avoidance of offensive statements against foreign nations (904). The Institute of Intellectual Coöperation was created "to deal with questions of intellectual coöperation" and, although the scope of its activities is in the main limited to questions of higher education, it stimulated the study of school textbooks through national committees, and publishes an *Educational Bulletin* and other information in the field of education, some of which will be mentioned later. Also under the League of Nations is the International Institute of Educational Cinematography with its headquarters in Rome.

Equally important for the student of comparative education is the emergence of international organizations of teachers and educators which at their annual or biennial meetings discuss reports on special subjects which have been prepared in advance. Thus the quarterly *Bulletin* of the *Fédération Internationale des Associations d'Instituteurs* has in the last few years contained discussions (in English, French, German, and Spanish) of such topics as practical means for the examination of the knowledge acquired in primary schools and the practical ways of selection to promote children from primary schools to different higher courses; the standstill of education for peace and the way out of the economical and political circumstances of our time; the training of teachers; the problem of young people's leisure; opportunities for organizing peace training in schools; and methods for the promotion of a continued cultural and professional education of teachers in service. On each topic reports from various countries prepared by teachers or their representatives and a summary of these are presented (882).

In the field of secondary education the *Fédération Internationale des Fédérations Nationales des Membres du Personnel de l'Enseignement Secondaire Officiel* (International Federation of National Associations of Teachers in Public Secondary Schools) has issued a number of reports which have resulted from inquiries on a variety of topics. These reports have constituted the bases for discussion at the annual congresses held by the *Fédération*. The following subjects have been reported upon, discussed, and published in the *Bulletin International* (883), which appears quarterly: secondary education for girls; overpressure in secondary schools; the overcrowding of the time-table; the functions of the school doctor; the out-of-school activities; the academic and professional preparation of the secondary-school teacher; the character, limit, and purpose of the educational task of the secondary teacher; the principles and conditions govern-

ing the admission to secondary schools. The reports are published in French, English, and German.

The New Education Fellowship, devoted to the promotion of progressive education, in addition to meetings of its constituent branches in each country, holds biennial international conferences, the proceedings of which are published (939, 941, 942, 943). In each country there is usually published an organ of the association (*Pour l'Ere Nouvelle* in France; *Das Werdende Zeitalter* in Germany until 1933; *The New Era in Home and School* in England).

The World Federation of Education Associations publishes proceedings of its biennial meetings which are devoted to the discussion of such topics as the following: character; moral and religious education; country youth and country school; health education; illiteracy; industrial education; international correspondence exchange; library service; adult education; behavior-problem children and adolescents; colleges and universities; preschool, nursery, and kindergarten handicapped children; elementary education; secondary education; parent and teacher—home and school; motion pictures; social adjustment; teachers associations; and preparation of teachers for international cooperation and goodwill. The Federation has recently begun to issue *World Education* as its official organ.

There are three important centers for study and research in problems of comparative education. The first of these, the Bureau International d'Education, is not a teaching institution but a clearing-house of information on education not only in those countries which are supporting members of the Bureau but throughout the world. The Bureau has published general descriptive accounts of education in fifty-three countries (855) which are brought up to date by an *Annuaire* (839). In addition to a number of reports on education for peace (842, 849, 856, 857), the Bureau has issued a large number of reports on special subjects, such as bilingualism (840), home and school (845), children's literature (846, 854), selection of books for school libraries (860), the married woman teacher (864), economies in education (847), compulsory education and its prolongation (862), admission to secondary schools (838), self-government in school (863), and group activities (865). Other reports have been devoted to the educational systems of different countries, e.g., Poland (848, 861), Egypt (852), Esthonia (853), and Roumania (858). The Bureau undertakes the preparation of reports on special issues at the request of its constituent members. Thus it has published a report on the preparation of elementary-school teachers (850), another on the preparation of secondary-school teachers (851), and a third on consultative committees in education (844). An annual report on the International Conference of the members on public education (843) has also been published. The special reports are in the main based on questionnaires addressed to and information received from ministries of education; in this sense they represent official views and interpretations rather than independent investigations.

The Institute of Education of the University of London was established as a center for the study of education for the British Empire. Its interest, however, is not limited to education in the British Empire. Through the publication of its *Studies and Reports* it is making available information on a variety of problems—education in the Far East and Near East, the education of backward peoples, etc. (829, 869, 873, 891, 894, 896, 917, 952). In connection with the Institute of Education there was begun in 1932 the *Year Book of Education* (946) under the editorship of Lord Eustace Percy until 1935 and subsequently of a joint editorial board. These yearbooks contain, in addition to a mine of information not otherwise generally available on education in Great Britain and Ireland, articles on education in the British Commonwealth of Nations and the leading countries of the world. Besides accounts of the educational systems, the yearbooks have contained articles on modern scientific aids to teaching, school architecture, ideals of religious education, the health services, universities in the British empire and the United States of America, education of the African native, education in the British colonies, and the League of Nations and intellectual cooperation; events in education in the English-speaking nations, survey of secondary education, creative education, the selection and supply of textbooks in the British Empire; events and special features in education in the English-speaking nations, the psychological aspects of child development, the testing of intelligence, outlines of medical education, other branches of professional education, education and the social crisis, the promotion of teachers in public elementary schools in the British Empire, and comparative study of native education in various dependencies; current events in education, problems of educational policy (with special reference to backward children), International Institute Examinations Inquiry, and juvenile delinquency in England and Wales.

Two of the purposes for which the International Institute of Teachers College, Columbia University, was established were "(a) to conduct investigations into educational conditions, movements and tendencies in foreign countries, and (b) to make the results of such investigations available to students of education in the United States and elsewhere in the hope that such pooling of information will help to promote and advance the cause of education." In fulfilment of these purposes the International Institute has published reports on the training of elementary teachers in Germany (826); on the attitudes of European students on international problems (889); on French elementary (913) and secondary education (918); on the teaching of modern languages abroad (929); on student homes in China (933); and on education in Iraq (905), Persia (954), Prussia (919), Hungary (922), Bulgaria (953), and Nazi Germany (915). The International Institute has conducted surveys and published reports on education in the Philippine Islands (937), Puerto Rico (938), and Iraq (936). Through its series of *Educational Yearbooks* (911), inaugurated in 1924 under the editorship of Dr. I. L. Kandel, the International Institute has

made available information on education in practically all of the countries of Europe, in many of the Latin American countries, in India, China, Japan, Australia and New Zealand, and in South Africa. In addition special problems have been discussed such as method, the elementary-school curriculum, secondary education, teacher training, and vocational education. Topics dealt with in the five volumes for 1930-35 include the following: the expansion of secondary education; education in colonial dependencies of Belgium, France, pre-War Germany, Great Britain, Italy, and Japan; the relation of the state to religious education; missionary education and missionary activities; education in France and Russia; and teachers associations. The *Educational Yearbook* for 1929 was devoted to the philosophy underlying national systems of education and serves as an introduction to the methodology of comparative education. Beginning with the *Educational Yearbook* for 1936, surveys of education in the past ten years in the countries discussed in earlier volumes will be presented and will furnish an opportunity for comparing progress and discovering tendencies in education. Under the direction of members of the International Institute a number of Ph.D. research studies have been prepared and published on various aspects of education in different parts of the world (827, 832, 833, 880, 885, 889, 892, 905, 920, 921, 922, 924, 927, 931, 933, 945, 947, 954, 963).

Sources of Information

Perhaps the greatest difficulty which confronts the student of comparative education is that of securing information on the progress and tendencies in education. It is difficult enough to keep abreast of the rapidly growing literature on education in each country; it is still more difficult in view of language handicaps to discover what is going on in foreign countries. Fortunately the task is being simplified or brought within measurable control by such publications as were discussed in the preceding section, by the rise of centers of information, and by the appearance of valuable bibliographies. Another difficulty which presents itself is that there is not or perhaps there cannot be any concerted drive in different countries on the same problems at the same time. The concentration on particular problems through the Bureau International d'Education has already been mentioned (838 to 865, inclusive); to this may be added the publications of the International Institute of Educational Cinematography, or such reports as those issued by the International Institute of Intellectual Coöperation on broadcasting (901) and public libraries and leisure (900), or the series of *Entretiens* (902); here also belong the reports of proceedings of international associations already mentioned. Information on adult education throughout the world has been made available by the World Association for Adult Education (974, 975), on agricultural education by the Institut International d'Agriculture (897), on commercial education by the International Association for Commercial Education (898), and on

technical education by the Bureau International de l'Enseignement Technique (866).

Cooperative study and research in the problem of examinations were initiated by the Carnegie Corporation through the International Institute of Teachers College, Columbia University, in 1931, when a conference was held on the subject in Eastbourne, England. The conference was attended by representatives from England, France, Germany, Scotland, Switzerland, and the United States, and resulted in the formation of national committees to undertake further research. Reports of these investigations have already begun to appear, and a report on a second conference held in Folkestone, England, in 1935, has recently been issued (871). A further extension of the investigation has been made possible by the appointment of committees in Sweden and Finland. The same problem has been studied and reported upon by the New Education Fellowship (940).

Although not the result of international cooperation the works of Swift of the University of California, which throw light on an aspect of educational administration (finance) in some European countries, not generally accessible, deserve to be mentioned (966).

Important guides to sources of information have been made available by the United States Office of Education in a bulletin on *National Ministries of Education* (825), and by the International Institute of Intellectual Co-operation in its *Handbook of National Centres of Educational Information* (903) which is a directory of the official, semiofficial, and private agencies for educational research and dissemination of information and which contains a list of principal educational reviews in each of the thirty-two countries concerned. To these should be added the list of educational yearbooks by Claparède (868), the *Education Index* (876), and the *Educational Abstracts* (877) which have recently begun to devote some attention to education in foreign countries.

The various yearbooks which have been mentioned will furnish a starting point for the student interested in the educational systems of foreign countries. Equally important for this purpose are the numerous encyclopedias of education which are now available, but, while no encyclopedia can be expected to be up to date, it can always be relied upon for useful information and references which will start the student on his way (837, 879, 881, 887, 907, 934, 944, 960, 965, 972, 973).

The task is beginning to be simplified by the appearance of bibliographies. In 1934 the United States Office of Education issued a bulletin on *Foreign and Comparative Education* (970), which contains references of a general character as well as special references on the educational systems of 103 countries—for the present the most comprehensive bibliography available from the point of view of the countries included. Another pamphlet published by the United States Office of Education presents a bibliography on the education of native and minority groups (872), and a mimeographed circular gives a list of references on higher education in foreign countries (824).

The International Institute of Intellectual Coöperation (899) has published a bibliography on education, prepared by national centers of information in twenty-two countries.

A remarkable and noteworthy, but unfortunately little known contribution to educational bibliography is the rich and comprehensive work of Blanco y Sánchez (831), formerly professor in the Escuela Superior del Magisterio in Madrid. The three-volume work is a bibliography of education throughout the world from 1900 to 1930. The first two volumes are arranged alphabetically by authors, the third by subjects, countries, and topics. The bibliography was supplemented for a few years by an annual (830) which unfortunately the author has been unable to continue.

Finally, the Bureau International d'Education maintains a bibliographical service, the results of which are published as a supplement to its quarterly *Bulletin* (841); the English edition contains lists of works in English only, the French edition, works in French and German. The bibliography, while useful, is by no means comprehensive since it is in the main restricted to the classification of educational news and reviews which appear in the *Bulletin*. The Bureau also communicates information on new departures in education to the educational press of all countries and maintains an exchange service of educational laws and decrees of special interest to school administrators.

Textbooks in Comparative Education

The scope of the field known as comparative education is so broad and has so many ramifications that it is no easy task to discuss textbooks in it. The field is in any case new and definitive works on the subject have not yet appeared. It is, furthermore, difficult to draw the line and say what book contributes to a knowledge and understanding of a nation's education. Phyllis Bentley's *Inheritance* for England or Sinclair Lewis' *Main Street* for the United States may furnish better material for a study of the respective educational systems of the two countries than any description of the schools. The approach may be made through a nation's literature and history, political and social theory, philosophy or anthropology, or through a combination of these, and produce a better picture and appreciation of its educational system than the dry bones of legislation, curriculums, and statistics. A good textbook in the history of education may well furnish the essential background for the study of comparative education.

The preparation of textbooks in comparative education as distinct from books on single systems of education labors definitely under the difficulties of defining the scope and the meaning of the term "comparative" itself. Since the point has already been stressed that any educational system is redolent of the traditions and culture of the people whom it serves, it is futile to expect that standards can ever be set up by which anything but the most technical aspects can be measured and these do not constitute the essentials. It is much more important, for instance, to study the interplay

between political theories and practices and education than to compare statistical data; it is more fruitful to consider why a country like France adheres to methods which are regarded as obsolete, why the United States is only too ready to welcome innovations, and why England represents a blend between tradition and adaptations to changing demands. The fundamental contribution which comparative education can make is to furnish the student of education with a methodology against the background of which he can understand the essential problems of education and appreciate the bases of theory and practice.

The first modern textbook on comparative education, edited by Sandiford (1956) of the University of Toronto, contains separate accounts of the educational systems of six countries knit together to some extent by a uniform scheme and a general introduction which discusses the basic approach to the subject. In 1931 there was published under the auspices of the teachers associations of Sweden, Norway, and Denmark a survey (1964) of the educational systems in ten countries (United States, Denmark, England, Finland, France, Holland, Norway, Switzerland, Sweden, and Germany); the survey consisted of ten articles which followed a general plan (educational organization, elementary education, continuation schools, secondary education, and administration) but without any discussion of backgrounds.

In 1928 appeared the "Kritische Vergleichung des Schulwesens der anderen Kulturstaaten" by Hessen (1895) which dealt with the educational practices of a number of countries under a number of topics, e.g., compulsory education, the state and education, the church and education, education and economic life, and the organization of education. Hans (1888), in his *Principles of Educational Policy*, followed the same method but under a greater variety of topics—democracy and education, the state and the church, the state and the family, centralization and decentralization, national minorities, educational highway, exceptional children, vocational education, teachers, curriculum, textbooks and methods, universities, adult education, educational finances, and education and politics.

Following the same general principle but with a stronger emphasis on the relationship between cultural backgrounds and education and without any attempt to be comprehensive, the present author's *Comparative Education* (1908) was intended to be a contribution to methodology, using six countries and the factual information arising out of them for illustrative purposes. The aim and plan of the book are indicated in the following prefatory statement:

The comparison of the educational systems of several countries lends itself to a variety of methods of treatment, depending somewhat on its purpose. One method of approach might be statistical on the analogy of the method of comparing returns of exports and imports, size of armaments, and so on; from this point of view there would be compared the total national expenditures for education, the cost, size and character of school buildings, per capita costs for different items of expenditure in the educational systems, the enrollments, average attendance, and retention of pupils through

the different levels of the educational ladder. By another method it might be possible to institute a comparison between education and national welfare and progress as expressed in statistics of illiteracy, the volume of trade and commerce, per capita wealth, or incidence of crime and poverty. These methods are attractive and may some day be useful; at the present stage, as is indicated in the text, it is impossible to institute comparisons of such a character until the raw material, the statistics, becomes more uniform and comparable. Still another method would be to undertake comparative studies of the quality of education in different countries; this, too, may be possible in time, but not before the instruments of measurement have been made more perfect and reliable than they are at present or when aims of education in different countries are more nearly alike, or finally, when tests have been developed which can measure more accurately the results of education rather than of instruction in fundamentals of subject-matter.

In the present volume none of these methods have been followed. The task which has been undertaken is to discuss the meaning of general education, elementary and secondary, in the light of the forces—political, social, and cultural—which determine the character of national systems of education. The problems and purposes of education have in general become somewhat similar in most countries; the solutions are influenced by differences of tradition and culture peculiar to each. The present volume seeks accordingly to serve as a contribution to the philosophy of education in the light both of theory and practice in six of the leading educational laboratories of the world—England, France, Germany, Italy, Russia, and the United States.

Accordingly the volume deals with education and nationalism, education and national character, the state and education, the organization of national systems of education, administration of education, elementary education and the preparation of elementary-school teachers, and secondary education and secondary-school teachers. After a general discussion of the first two topics, the issues involved in each of the other topics are discussed before the characteristics of each country are taken up.

Other variations of these methods will no doubt be developed. The most important advance made so far is that the scope of methodology and research in comparative education is beginning to be defined and that the study is beginning to be raised above the purely pedantic preoccupation with details of facts and technics which have meaning only in the light of the backgrounds of their origin. This brief survey may well close with a quotation from Professor J. Dover Wilson's introduction to the work by Hans (888: viii):

There is no reason why Comparative Education should not prove as interesting and fruitful a study as Comparative Politics. The time will come when men realize that the structure of a nation's educational system is as characteristic and almost as important as the form of its constitution. And when it does, we shall have our educational Montesquieus analysing educational institutions, and our Bryces classifying them.

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(Literature reviewed to approximately January 1, 1936)

Prepared by the Committee on Mental Hygiene: Willard C. Olson, S. L. Pressey, Percival M. Symonds, J. Harold Williams, and Harry J. Baker, *Chairman*; with the cooperation of John P. Anderson, John J. B. Morgan, and George S. Stevenson.

TABLE OF CONTENTS

Chapter	Page
Introduction	459
I. Historical Development and Modern Trends	461
GEORGE S. STEVENSON, <i>National Committee for Mental Hygiene, New York, New York.</i>	
II. School Influences	471
S. L. PRESSEY, <i>Ohio State University, Columbus, Ohio.</i>	
III. Community Influences	478
JOHN J. B. MORGAN, <i>Northwestern University, Evanston, Illinois.</i>	
IV. The Normal Child	490
PERCIVAL M. SYMONDS, <i>Teachers College, Columbia University, New York, New York,</i> and JOHN P. ANDERSON.	
V. Behavior Problems and Delinquency	499
J. HAROLD WILLIAMS, <i>University of California at Los Angeles, Los Angeles, California.</i>	

VI. Physically and Mentally Exceptional Children	514
HARRY J. BAKER, <i>Detroit Public Schools, Detroit, Michigan.</i>	
VII. Technics and Instruments of Mental Hygiene	524
WILLARD C. OLSON, <i>University of Michigan, Ann Arbor, Michigan.</i>	
Bibliography	537
Membership List	564

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INTRODUCTION

ALTHOUGH PRACTICALLY ALL TOPICS or fields of education have been covered twice in cycles of the *Review of Educational Research*, this is the first number devoted to mental hygiene. As a former member of the editorial board, the chairman pointed out the possibility of mental hygiene as a topic for review, and somewhat true to form in such matters he was assigned to a committee to prepare it.

Mental hygiene has a wider scope than many of the traditional activities of education. It extends beyond the limits of subjectmatter into the whole life of the child. Many of these non-school influences are apparently as important as school in molding the lives of children, although education has been only vaguely aware of their true significance. This *Review* is dedicated to a better understanding of these factors and of their influence upon children, and to the goal that education may develop a broader base so as to better capitalize them.

George S. Stevenson, M. D., of the National Committee for Mental Hygiene, and John J. B. Morgan, of Northwestern University, have kindly prepared sections of this report for our committee. Special acknowledgment is hereby given them for this service.

HARRY J. BAKER, *Chairman,*
Committee on Mental Hygiene and Adjustment.

CHAPTER I

Historical Development and Modern Trends

TODAY the term, "mental hygiene," is familiar in the idiom of teacher, doctor, judge, social worker, nurse, and even minister. There is probably no other special tool of speech that is used as much in common by these groups. There is, therefore, none more promising to use as a bridge to span the gaps between their fields. The concepts underlying the term "mental hygiene," to be sure, are not entirely agreed on, but there is enough uniformity to allow it to serve as a vehicle of intercommunication.

This is rather a remarkable fact when one considers that at the opening of the century, the term was unknown. The knowledge which mental hygiene has come to include was then found in the frontiers of several isolated professional fields working almost independently to advance their scientific borders. These fields—education, medicine, theology, social work, etc.—were isolated from each other because they started from what seem to be discrete human problems—ignorance, illness, bewilderment, and poverty, whose full relationship to each other is not obvious. The activities that mental hygiene has now come to represent were earlier the unrationalized and intuitive expressions of genius rather than scientific formulations. They are such things as Burnham discussed in his *Great Teachers and Mental Health* (6). But the trend of every live profession is to rationalize its intuitions through scientific method. The different scientific forefronts and the variously worded principles laid down by different professional leaders had so much in common in their fundamentals that a single term "mental hygiene" reflecting the needs for happy, productive living, of the whole person, not just the condition of his heart, lungs, etc., was seized upon readily. Since then the interchanges of these various fields have been much more striking and there is no one of them but finds itself progressing faster because it is enriched by facts and ideas that it has taken over from the others.

Another influence must be recognized as setting the stage for the acceptance of the pervading concept of mental hygiene. At the same time that mutual interests were being discovered in the professional fields, the professional people were being forced farther and farther apart by the growing bulk of scientific fact and the need for specialization and division of labor to retain control of this fact. There was need for a unifying device to compensate for the insufficiency of human scholarship. The term "mental hygiene," helped counteract this dispersion because it described the common objective toward which each was working.

Most important of all is the fact that the concept, mental hygiene, helps the scientist to retain the lay and the primitive perspective and appreciation

of the person as a unified creature. Professions are interested in the behavior of man's parts or his organs chiefly as these parts influence man's dealing with life's demands. Narrower scientific perspectives have often blinded us. We are forcing ourselves to get over the idea that a child can be a purely health consideration on Thursday, a learner on Friday, a player on Saturday, and a prayer on Sunday, or that he grows from birth to five, learns from five to twenty, and works from then on. We discount the idea that a teacher's life from 4 p. m. to 8 a. m. is her own private concern apart from her teaching. We have found that all these functions go on inseparably at all times, in complete mutual dependence, and that we have effected these divisions artificially in order to simplify a complexity that is life itself.

Receptivity to mental hygiene has thus been aided by these three circumstances: (a) the overlapping of fields through scientific growth; (b) the demand for a unifying instrument in the face of specialization and division of labor; and (c) the need for a broadened scientific perspective on human integration. It will perhaps be of value to inspect briefly the early life and parentage of mental hygiene in more detail because an understanding of its genesis will clarify its meaning.

Milestones in the Evolution of Mental Hygiene

In its overt form mental hygiene was first concerned with the care of the mentally ill. It came to include certain facts and practical standards that could be used to combat obvious defects in the treatment of these unfortunates, such as overcrowding, antiquated methods of treatment, physical restraint, insufficient staff, fatalistic attitudes, and harmful methods of legal commitment.

This interest in the institutionalized psychotic naturally led, as a second step, to the closely related needs of the mentally defective and drew into mental hygiene such information as would influence both institutional and community control of those so handicapped. It was at this point that the first overt connections with the field of education took place, for community control was to a large degree dependent on preparation for community living. The special class in the public school was designed to provide a large part of this preparation.

The relation of mental deficiency and psychopathology to crime made it imperative that mental hygiene should embody pertinent fact in the field of criminology, at first looking toward a better understanding of the individual criminal, later toward treatment and prevention. Preventive approach as contrasted to the public health approach. It has been conceived of, however, as a complement rather than an alternative to the mass attack. The individual study and treatment of the delinquent were at first applied at the beginning of his law breaking, but these efforts soon revealed the greater strategy of attacking before the overt stage. The attack thus

became a non-specific approach through treating the disorders of behavior and personality of children, rather than through overt infractions of the law. One could not tell in many cases whether or how much one might be dealing with a developing criminal or psychotic or both. The development of the child guidance clinic was a direct response to this demand for a preventive approach to delinquency by careful individual study at the earlier stage.

The individual study of cases, furthermore, gave unprecedented evidence of the mass social defects that produce individual deviation, and supported the principle that prevention must be communitywide (4). While there is a tendency to draw into mental hygiene these broader sociological elements and certain elements of classroom organization give promise in this direction, little progress has been made to date beyond the individual approach. This communitywide concept of prevention leads logically to the viewpoint that mental hygiene is achievable only through the success of many community agencies. Only so far as schools, social agencies, health agencies, courts, and recreational centers, including industry, succeed in developing human potentialities and refine their scientific foundations and technical methods, can mental hygiene progress.

Mental hygiene has become enmeshed with education at several points. The early interest in the mental defective led directly to the special class and the whole testing movement. The child guidance clinic was jointly sponsored with the visiting teacher movement by the Commonwealth Fund and found its most consistent sponsors among school men. Mental hygiene services to college students and studies of mental health implications in the training and selection of teachers do not by any means complete the list.

The serious shortage of personnel created by these applications of new and borrowed fact, and the new functions added to old professions have had much to do with changes in professional education: social work, psychiatry, nursing, theology, law, have all become more dynamic and more therapeutic. More recently, in line with the whole community concept, general medicine and public health have tended to accept their responsibilities for influencing mental health (2). Meanwhile, steady progress in teacher-training institutions has been made through absorbing these accumulations of other fields routed through the channel of mental hygiene (11).

While the popularization of new scientific developments, concepts, and technics as they pass from one field to another has often savored of a vogue, the general tendency of mental hygiene has been a critical scientific eclecticism and a diminution in the identification of mental hygiene with any one of the disciplines. Psychiatry is tending to see its own ambitions realized only as other professional fields assume quasi-psychiatric functions (10). This has encouraged a greater openness on the part of professions toward the acceptance of facts bearing on mental health regardless of their source.

Cultural Relationships of Social Problems Demanding Mental Hygiene

The needs to which mental hygiene is a response are found primarily in the field of criminology, psychiatry, social service, and education. Delinquency, mental disease, dependency, and school failure may in part be conceived of as the waste products of our existing unstable social structure and processes. This instability is not in itself a curse, but a very necessary requisite for progress. Any progressive achievement presupposes a degree of instability, that is, readiness to change. At the same time, the change may not always be for the better and if we want this capacity to progress, we must take the risks of instability; these social problems are in part the price. An extremely stable and adjusted society is static and does not progress.

The social consequences of the caste system have proved to be extremely unfortunate. In a static society regulated by a strict caste system, the place of each individual is fixed from the moment he is born and that place cannot be changed under any circumstance in this world and in this birth. This is a total negation of the dignity of man, as a man, and the democratic principle of individuality. It entails terrible loss for the society in every direction. It runs counter to the principle of selection which reigns supreme in nature. It gives a sort of stability to society provided the habit of "no questions asked" is inculcated. For that reason it kills all initiative and men lose their faith in effort and the pernicious doctrine of fatalism rules supreme (3).

A parallel to unstable productive social structure is seen in plant breeding where instability brought about through crossing results in a few valuable new hybrids, but only at the cost of many that are useless (cf. delinquency, mental disease, school failure, poverty) which must pass into the discard. Accordingly we are at present attempting to transform social waste products into innoxious debris (cf. custody) where conversion into valuable by-products (cf. social rehabilitation) is unattainable.

There always have been differences in the way these social problems have been met, differences due to arbitrary or empirical principles, but during the past two centuries scientific progress has affected the very foundations of these arts and induced some generally accepted procedures. The evolution of mental hygiene cannot be understood without some appreciation of these advances. In the central position are those sciences of human behavior: physiology which is concerned with the behavior of tissues, organs, and system of organs; psychology, taking up the sequence there and concerning itself with these systems combined into what we call a person; then sociology, dealing with the behavior of persons integrated into society; and finally culture carrying the sequence into the limbo of science. These sciences go by four names, but actually they are one continuous science of human function. Hand in hand with them the arts of pedagogy, medicine, criminology, and social work have made a parallel progress. While it is obviously impossible to discuss the advances made in each of these fields in detail, certain highlights can be selected as representing the primordium of mental hygiene.

Advances in the Sciences Contributing to Mental Hygiene

In physiology, scientific discoveries have thrown special light on human integration. The integrative value of the central nervous system has been further elucidated by new technical processes of microscopy and experimentation and it appears to be less the autocrat than had once been supposed. Tradition that the different traits of character are controlled by different parts of the brain has been shattered by careful research and study of cases of brain disease and injury. What remains of brain localization is concerned largely with specialized sensory and motor functions such as vision and not directly with derived, complex, or symbolic functions of character traits as Gall and the phrenologists would have had us believe. On the other hand, more generalized brain disorders, such as result from violence, defective growth, or infection are seen to disrupt or limit behavior in a more general way (1), and while specific motor and sensory functions may remain intact, the derived functions suffer. This has led, on the one hand, to the discovery of brain disorders previously unrecognized and, on the other, to mild mental states accompanying less serious anatomical lesions. The fiction that brain clot or pressure explains crime, mental defect, or insanity has been reduced physiologically to extremely narrow proportions compared to popular belief. Meanwhile, other integrating mechanisms of human conduct have become more evident. Our knowledge of the importance of metabolism and nutrition in affecting behavior has expanded. The glands of internal secretion have proved at times to be none too subservient vassals of the cerebro-spinal overlord, at other times too responsive. Here, also, the idea that this gland or that rules over a certain function has given way somewhat as the interrelationship between glands appeared. The definite response of cretinism (absence of thyroid gland) to thyroid feeding did much to stimulate study in this field and we are led to a better understanding of these glands of internal secretion and their effects on physical and personality development. Of importance to mental health also was the better understanding of the relationship between one's feelings and emotions and one's vegetative nervous system and behavior of one's organs (7, 14). It showed that we have to know about the affective life of the person with a stomach complaint and also about the stomach of the person with a grouch. Our norms of health and disease have been quite confused by these antics of organs in the face of difficult life situations. On the abnormal side, toxic and infectious conditions, fatigue and malnutrition have proved to be important for their upsetting effect on behavior generally as well as for their interference with the work of some particular organ. To put several of these advances on a practical basis, simple laboratory technics for measurement and diagnosis have been developed. Less and less can it be confidently stated that the disturbance of any particular organ, heart, lungs, eyes, stomach, leg, is separable from the total life situation of the person, both as to its causes and as to its effects (8). The gap between physiology and psychology has thus been closed and the separation relegated to the artificial.

Psychological advancement naturally was not separable from that in physiology; as it concerned the problems of delinquency, dependency and mental disease, and interferences with education, it came chiefly from the abnormal field. In all these there was built up a mass of fact showing how the later or adult behavior is genetically connected with earlier behavior or experience. These advances depended on the development of new methods. One method (psycholanalysis) rests largely on the memory of the subject (released from repression) and the interpretive capacity of the examiner. Psychoanalysis started out with mentation as an unexplained fact to be taken at face value. In general, it attempted to make little connection with underlying physiological functions excepting in such efforts as those of Alfred Adler who pointed out the psychic meaning of bodily defects. Even then, the psychological mechanism did not join hands with the physiological. Contrasted to this, though not conflicting seriously with it, was objective psychology which rejected the postulation of the mind and sought an understanding of behavior through simpler and related reactions and circumstances. Thorndike and Pavlov striking independently from distant beginnings opened points of identity of two fields, psychology and physiology. William James and his pupil, G. Stanley Hall, instilled a fluidity into current thinking and by encouraging practical applications forged permanent links between psychology and education.

Contrasted to this dyamic psychology, which was concerned chiefly with changing emotional responses, was the progress in measuring intellectual and later other mental capacities. This greatly facilitated the acceptance of individual differences as a prime fundamental to planning for healthy mental development. Impetus for this was provided by Binet, of course preceded by the spade work of others. Analytical and experimental work in the field of education gave an appreciation of the learning process that was needed in order to use our knowledge of these differences. The classification of soldiers during the war not only gave publicity to testing methods, but offered an opportunity for their refinement and evaluation. It also prepared personnel for the coming demands of the clinical field. The contrast of the dynamic and appraisal psychology today again is breaking down on all sides, the interests and technics of one being carried over abundantly to the procedures of the other. The institution for mental defectives is finding psychopathology and in the light of a better appreciation of dementia praecox.

None of these biological fields is well delineated. In consequence of this we constantly find the workers of one contributing to the other. Much of the advance of sociology is attributable to this proximity to other sciences. Sociologists have organized and refined material thus acquired besides adding to it out of their own store of fact and procedures. Studies of the theory and genesis of law and mores are basic to a consideration of the needs of the violator and the one protected. The improvement of technics

of social examination in line with revelations of biological functions of family and community, broadened the perspective on the individual to a point where he could be rationally treated. The indirect attack on social problems would have been blind without such a guide, and prevention through community organization would have been inconceivable.

Technical Advances Contributing to Mental Hygiene

Advances in the technical fields have resulted from progress both in the sciences basic to human function and in empirical technics and refinements of technical organization. In every case the movement was from the mass, toward the individual approach and often back again toward mass application of things discovered by individual approaches. It was from the developed situation to the full-blown problem to the incipient one, from the mere detection of problems (diagnosis) to their correction (treatment) and their anticipation (prevention). Progress has also been from indirect, manipulatory, environmental approaches to direct utilization of the individual's capacity to progress on a more voluntary basis. In all fields there is more or less of a tendency today to be moved not merely by people who are sick or in trouble or who are irritating society, but by well people whose resources have been allowed to go to waste. Pedagogy, psychiatry, criminology, and social work have all had a part to play in this more positive effort. But criminology, psychiatry, and social work are bound to be largely occupied with custody, treatment, and prevention. Pedagogy, pediatrics, and public health are coming to be recognized as the fields par excellence for the positive conservational effort. The genetic studies of social problems has led invariably to this conclusion.

The diagnostic, remedial, and preventive aspects of schoolwork have contributed much to the evolution of mental hygiene. The consideration of sensory and motor handicaps in relation to learning has provided experience that bears on the determination of human behavior generally. Special educational programs to provide segregation for the protection of the majority or better to meet special defects and needs of those segregated has brought forth general principles of individualization that proved to be generally applicable not only to other school children but to other fields. Identical principles have been elicited in other fields in a way that has given further support to the concept of oneness in the person. Some of these principles: spontaneity, the opportunity for the individual to grow along lines constructed by himself; directive supervision in which the direction is laid out for him to follow; imposed experience providing, in addition, the initiative from without, and securing of perspective through verbalization, call it confession if you will, have found their places in all these fields, often under differing names. Frequently, the preoccupation with one or the other of these methods has produced a one-sided approach, although the emphasis so effected has had value.

In all these fields and again particularly in the school, the rightness and wrongness of method has been accepted as relative (e. g., as to the time and place). The ideal Negro school in the South or the secondary school of 1900, are not accepted as appropriate for New York or 1936.

Similarly in psychiatry, the efforts of Beers (5) in the twentieth century were relatively more influential in the care of the insane than those of Dix in the nineteenth or Pinel in the eighteenth; because they were tuned to a period of social receivability, the world was ready for them. Also, the psychiatric classification of Kraepelin, which in the nineteenth century constituted an immense forward step in bringing order out of chaos, became the twentieth century strait-jacket of the institutional psychiatrist and has slowed up his progress in the direction of a genetic and dynamic concept of mental disorder, in the subordination of diagnosis to treatment and the inclusion of the community in his thinking about patients, and in mental disease as a social problem. Classification has given a false feeling of definiteness and has clouded the fact that each person is an experiment of nature that is never repeated. For each person nature has set up a different combination of circumstances of which the person and his behavior is the resultant. These circumstances include heredity, past experience, health, physical make-up, and all present life experiences and activities. They tell us what a reconstructive, preventive or even a positive approach must touch in order to effect growth; they force us to a very broad scope for mental hygiene. The development of the psychopathic hospital was an effort to get away from some of the constraints of previous forms of psychiatric organization; the development of the community (child guidance) clinic represented another. Pressure for improvement of the more backward state programs and for the certification of psychiatrists served more to relieve the field of a drag than to enhance the forefront. On the other hand, the steps to advance the teaching of psychiatry in medical schools buttressed the frontier of the field whose progress cannot proceed any faster than its provision of well-equipped personnel.

While the recording of certain factual data in connection with service to individual cases has long been routine, the conception of this "history" at its best, as in reality an examination of the patient through his past experiences, social situations and their reflections of him, was necessitated by the genetic concept. The utilization of this historical part of the examination as a method of treatment in itself grows very logically out of the concept that all experience is dynamic. The verbal review of the past and of the setting is such an experience that many have treatment value. This has become a milestone in the progress of social case work. At the same time, it is not characteristic of any one endeavor.

These scientific and technical changes that have been so intermingled in the various fields that they cannot be identified with any one have become the body and spirit of mental hygiene.

One cannot consider the development of mental hygiene during the past twenty years without appreciating the very important role of psychiatric social work. On the one hand, this new activity grew out of several pressing needs; on the other, it later related itself to phases of community service which contributed little to its origin. Out of the queries of psychiatry as to what happens to patients discharged from mental hospitals, and what environment and circumstances have contributed to their breakdown, out of the field investigations of those interested in the heredity of mental disease, out of the shortage of psychiatrists during the World War and the need to conserve their efforts through technically trained assistants, out of the inevitable yearning of social work to understand its clients, out of all these things and more came that combination of functions known as psychiatric social work. Several schools, notably Smith College and the New York School of Social Work, early established full training courses for psychiatric social work and thus gave it a professional definiteness that has afforded it security and courage to forge ahead. Once established, this training proved an unparalleled preparation in mental hygiene and opened a demand for those so trained as aids in other than the medical and social work field. As visiting teachers, probation officers, consultants in nursing agencies, in fact in practically every professional field using or working toward an individualized approach, the psychiatric social worker has been called on as a mental hygiene aid, and in this way the experiences and viewpoints of one field were made available to others. It then became evident that what appeared to be a specific preparation for a definite field was not so specific after all. The essentials of psychiatric social work representing the dynamics of human relationships were specific of nothing short of all professions dealing with people in need or in trouble. Today, therefore, several professional fields that formerly thought their foundations to be pretty distinctive are trying to clarify their boundaries. The presenting symptoms that used to distinguish them—poverty, illness, antisocial behavior, ignorance—are so often traceable to the same cause that the symptom cannot act alone as the distinguishing feature. The differences between the professions seem to lie more in the grasp of such specific things as degrees of disorder, laws, methods of organization, customs, and technical devices than in varying appreciations of human behavior.

Closely related to this development in social work is the viewpoint that the material or personal service contributed by the professional worker—the health formulas of the nurse, the treatment plan of the doctor, the lesson of the teacher, the financial or planning help of the social worker, and the protection of the juvenile court—require a technical approach that is in itself a very personal thing. This case work is needed both to make the formal contribution more effective and at the same time to preserve to the recipient the highest potentialities for growth and self-realization that he may be neither materially nor spiritually pauperized. This requires a fluidity in the professional organization which is not always an asset. It has to be tuned to the

stage of social progress of the community in order that it may not merely result in advantage for uninspired political opportunists. The juvenile court has suffered from this political interference and such procedures as commitment, individual study and classification, indeterminate sentence, parole, probation, and vocational training, all inherently sound, have so often worked in the wrong way because the right hands were not there to direct them.

All of these measures that call for flexibility and allow for the salvaging of special potentialities, person by person, require a high degree of security and general mental health on the part of those administering them, and to a degree of the community as a whole. In the absence of this security, the community becomes alarmed. It protests against the coddling of prisoners, the boondoggling of the unemployed, and the spoiling of children by progressive education.

The viewpoints and principles that have become identified with mental hygiene have found expression in the child guidance clinic. It was organized on the principle that the fields dealing with people in need or in trouble are not clearly separable. It thus combined in one staff the psychiatrist, psychologist, and social worker. It set up a mechanism, the case conference, whereby the examinations of these specialists were seen as merely parts of one large examining procedure, and out of which one plan of treatment emerged. It set up the same principle in relation to other community agencies, administratively separate from it, and called the principle "cooperative case work." Under this principle, the staff of two or more agencies dealing with the same case meet as one unit and plan together. It adhered to a high standard of professional training and its cooperative case work has tended to foster high standards elsewhere. It acted not only to help the case, but to give community leadership in mental hygiene generally—a public health leadership in the mental field. It has tended to insist on the assumption of mental hygiene responsibilities by other community agencies rather than to deal with all cases itself. As one clinic put it: "In so far as we are successful, the demands for our case services by other agencies will grow less and less." It is undoubtedly true that the period of greatest opportunity is not when the child has become a patient in need of clinic service, but while he is just a child in a family and a pupil in a school.

CHAPTER II

School Influences¹

THE REVIEWER saw something of the mental hygiene movement fifteen and more years ago. The present review naturally leads to comparison of that era and the present. Two changes seem notable: the development of research and even experimentation in the field, and the growing emphasis on the importance of the school in any adequate mental hygiene program. The research approach will be evident throughout this review, and the amount of material bearing on mental hygiene in the school will be evidence of the second point. Certain material, such as on motivation, may seem outside the field of mental hygiene, but seemed best included because of important relationships.

Mental Hygiene and Teacher Training

Ways in which the teacher's personal problems of unhappiness or insecurity and differences in social attitudes of teachers and pupils influence pupil-teacher relationships were discussed by Meredith (53). The author felt that the achievement of an objective point of view should be the teacher's goal. A plea for preventing the temperamentally unqualified from entering training schools for teachers was made by Townsend (76), who reported investigations indicating clearly the prevalence of emotionally unstable, neurotic, and even psychopathic personalities in public school teaching positions. "Studies have disclosed that the chances are almost 7 to 1 that in the course of 12 years of public school education a child will encounter at least 2 such maladjusted persons in the teacher's position." An elaborate study of characteristics by W. S. Phillips (64) included emphasis upon the importance of emotional adjustment and lack of neuroticism in selecting teachers.

Causes of teacher maladjustment were drawn from correspondence over a ten-year period with young teachers in four different training schools by an English writer, M. Phillips (63). These causes were grouped under nine heads:

1. Personal difficulties of a kind to be intensified rather than relieved by the strains and stresses of vocational training, and subsequently of professional life
2. Un-suitable placing of young teachers in their first posts
3. Unfavorable conditions of work such as inadequate buildings and equipment
4. The management of large classes and treatment of difficult individuals
5. The attitude of head teachers and older members of the staff toward young teachers

¹ The author wishes to acknowledge the assistance of Ruth Vendig, graduate student at the Ohio State University, in the preparation of this chapter.

6. Divergence of educational outlook and practice between generations
7. Social conditions in the school area
8. Insufficient leisure during the first two or three years of teaching life
9. Financial difficulties.

Items 4, 5, and 6 appeared to the author to be most important. Case studies illustrating each type were included.

An attempt to discover the relation between teacher and pupil stability was made by Boynton, Dugger, and Turner (18). Seventy-three fifth- and sixth-grade teachers, and 1,095 of their students selected at random, filled out the Woodworth-Mathews personal data sheet to which had been added twenty-five similar questions. In terms of this inventory, the pupils of the teachers who had the best mental health were more stable on the average than were the pupils of the most unstable teachers, although the student-teacher relationships had existed only about two to two and a half months prior to the study.

An outline of possible psychiatric contributions to teacher training, involving suggested courses of study and the set-up of an organization for promoting the mental health of students and staff, was furnished by Patry (61). Five pages of selected references are included. Suggestions as to how the teacher may aid in pupil adjustment by "an awareness of the significance of certain behavior tendencies in the young child" were made by C. W. Flemming (30). A case study is included. A course in personnel work was presented by Strang (72), from the standpoint of (a) the teacher's role in personnel work, (b) methods and information useful in the identification and solution of problems of students, and (c) technics which enable teachers to make effective contacts with students and to cooperate with specialists. From the psychoanalytic school, Homburger (38) claimed that knowledge of psychoanalytic concepts is a necessity for the teacher in understanding his pupils. Only thus (the contention is) can the teacher really understand what is back of the questions and acts of the pupils.

It has frequently been noted that the teacher who is uninformed in matters of mental hygiene is apt to emphasize as a problem case the child who is disobedient and difficult to control, while ignoring the quiet, withdrawn child who in reality may present a more serious problem from the mental hygiene point of view. Laycock (46) found this to be true of a group of Canadian teachers. He asked them to list items of undesirable behavior and to rate the seriousness of these acts; the ratings correlated $-.125$ with ratings of mental hygienists. However, Peck (62) found that the majority of the characteristics which teachers in his classes considered important in the selection of maladjusted pupils were really undesirable personality traits.

In short, the importance of the teacher as the outstanding factor in the mental hygiene situation in the school, and of both selection and training of teachers in the light of this fact, is becoming increasingly evident.

School Procedures and Mental Hygiene

There has been much desirable emphasis on the extent to which the routines of the school involve consequences in the field of mental hygiene. Four contributions from abroad are to be noted. From Switzerland has come a volume by Schohaus (67) on "the dark places of education" based upon replies written to the editor of a Swiss educational paper in answer to the question, "From what did you suffer most at school?" The results were more than interesting, stressing children's suffering from contempt and sarcasm, excessive demands, and corporal punishment. Valentiner (80) discussed the conflict arising as a result of the uniform demands of the school, the very different individualities of the pupils, and the possibilities of a therapeutic pedagogy. Heller (35) pointed out the adjustment problem in going from school to vocation, the numerous mental hygiene problems arising in school, and the need that the teachers should educate the public in mental, as they have in physical, hygiene. That the teacher may by such simple and natural acts as praise and recognition of good work (the praise, however, causing jealousy and antagonism on the part of the other pupils) cause life-long maladjustment of individual pupils is illustrated in a case study by Mey (54).

Myers (56) discussed practices found in schools, with an analysis of their desirability or undesirability from a mental hygiene point of view. Wile (84) stressed the importance of failure in school as leading to truancy and delinquency and presented the "challenge of childhood" to society, asking the educator and psychiatrist what is being planned that children may develop into adults who are not only physically sound but active intellectually, emotionally mature, and socially adequate. Washburne (83) supplied the educator's response to this "challenge of childhood" with a description of the progressive school's efforts to give the child a sense of security, outlets for energy, and opportunities for group participation and adequate personality development. Curiously, a summary of the work of the Winnetka schools is included.

C. W. Flemming (29) furnished an account of the guiding principles and technics employed in student adjustment at the Horace Mann School. The author considered such topics as functions of a division of psychological service and pupil adjustment, classification of pupils, problems of adjustment for individual children, integration of interests and activities of school staff for constructive effort toward pupil adjustment, the school's responsibility for superior children, and dynamic individual pupil records and reports.

The activity program of the Newark schools was reported by Trolan (78). The use of group projects in the first two grades has given the teacher time to study the child's individual problems, guide early school adjustment, and adjust work to ability so as to develop confidence and a feeling of security. Possible contributions of physical education to mental hygiene were emphasized by J. E. Davis (27).

Problems of evaluation of pupils' achievement are in great need of consideration by the mental hygienist with regard to their bearing on individual adjustment and motivation. A digest of the literature on marks and marking systems was made by Crooks (26) with consideration of such topics as purposes of marking, reliability of marks, ability grouping, and absolute standards. A bibliography of eighty titles is included. Hill (37) reported an analysis of the report card in present practice:

Variation in practice seems to be the distinguishing feature of the 413 report forms analyzed. . . . In general, the reports of the kindergarten, primary, and elementary grades are less formal and represent a more progressive educational outlook than the reports of the secondary schools. . . . The lower grade cards are more frequently informal in appearance and in the letter to the parents, more often unconventional in their marking systems, more concerned with character and health outcomes.

Three studies show interest abroad in these problems. Muchow (55) discussed the revision of scholastic reports in Germany, with consideration of the value of "psychological portraits" rather than formal marks. Two French investigators, Laugier and Weinberg (45), found French professors highly unreliable in examination grading. In addition to the usual findings of disagreement between graders they added this delightful bit, that a person totally ignorant of a subject could, after reading a few papers, turn in as reliable grades as professors of that subject. An investigation into the fears connected with examinations, which according to the above evidence might well be warranted, was made by Redl (66). The causes of such fear were classified, with stress upon such factors as the attitude of teachers and of parents, and "pathological fear." Such topics were discussed as the teacher's attitude toward such fears, means of preventing them, and underlying causes.

A discussion of school discipline from the developmental rather than the repressive point of view was offered by Huang (39). He stressed psychological causes and treatment with reference to characterological outcomes. The problem of school discipline in India as made particularly difficult due to the influence of political agitators, was discussed by Maiti (50), and a psychological viewpoint stressed.

The honor system, a device used in school administration, is of some interest from a mental hygiene point of view. Wahlquist (81) reported a survey of eighty-one major colleges and universities in the United States regarding their use of and attitudes towards the honor system. He found that universities; that more institutions have used and abandoned this system than are now using it; that the most frequent cause of failure with this system is lack of student cooperation; and that it appears to be most apt to succeed in small professional schools and private colleges where it is supported by tradition.

Mathews (52) investigated the attitudes of students and faculty members of Ohio Wesleyan University toward academic honesty, by means of a personal opinion blank. The author found rationalizations employed to justify

almost any form of academic dishonesty in this university, where the honor system has been employed for twenty-five years, and interpreted his results as indicating that honor systems are ineffective.

Organization of Mental Hygiene Work

A detailed questionnaire study on the organization, personnel, training, practices, etc., in thirty-four psychoeducational clinics in colleges and universities was presented by Witty and Theman (86), who found that "very few institutions of higher education offer a curriculum and provide opportunity for clinical work which appear adequate to prepare individuals for mental hygiene and psychoclinical work." Cattell (23) reported the relations between psychologist, teacher, and physician, and the organization of the psychological clinic in British cities. Ide (40) discussed the organization of the Division of Special Education of the public school system of Philadelphia, with an account of the different types of problem children with which the division deals. Snedden (68) outlined the work of a psychoeducational and mental hygiene clinic. Newell (57) emphasized the importance of cooperation between home and school in the prevention of maladjustment.

McBee (49) stressed the need for a mental hygiene clinic in every high school. He attempted to evaluate the behavior problems, the methods of study, and the results, in connection with 328 normal adolescents in a Chicago high school dealt with in a demonstration mental hygiene clinic. Improvement occurred in 70 percent of those presenting scholarship problems, 83 percent of those presenting personality problems, and 100 percent of the delinquents. A plan for a mental hygiene unit in the high school was presented. The importance of a coordinated mental hygiene program in secondary schools was also emphasized by Zachry (87).

Williamson and Paterson (85) described counseling at the University of Minnesota where certain members of the faculty are appointed as advisers for problems of speech disorders, mental hygiene, social relationships, finances, and employment. Each adviser who gives this "out of routine" advice to students reports to a faculty-student contact desk in order to coordinate this work and prevent duplication in case a student should contact another adviser. The paper includes an analysis of 3,970 problems discovered and discussed by 287 faculty members in one week. The set-up of a college mental hygiene unit was outlined by Patry (60).

Motivation

An important summary of forty-two experimental studies dealing with the problem of incentives has been prepared by R. A. Davis and Ballard (28). The authors found that "investigation in this field was hardly known before 1920, when there is a marked increase in the amount of research which has been produced." Important conclusions may be summarized as follows:

When pupils are informed concerning the quantity and quality of their performance of tasks, effort and attitude are improved. Praise is more effective than reproof as an incentive, although any comment is better than a neutral attitude. . . . The presence of a co-working group has the effect of increasing the number of ideas and speed of the individual, but the quality of the thought processes is usually superior when the performer is working alone. . . . Individuals tend to improve to a greater extent when they are working for self than when working for the group of which they are members.

A study of the effects of a continued story, a game, reproof, praise, an Easter party, and delayed play upon drill in arithmetic in the fourth grade was reported by Warden and Cohen (82). The authors concluded that "these commonly used incentives are not as effective as might be supposed, at least insofar as the type of task investigated is concerned, when applied under schoolroom conditions. . . . The incentives used were mainly effective in inducing accuracy, and in many cases at the expense of speed."

A study of the effect of competitive motivation versus no given incentive upon addition and number comparison tests administered to 217 pupils in the sixth, seventh, and eighth grades has been made by Zubin (88). The author reported measurable improvement produced by the incentive. The effect of knowledge of results upon the performance in arithmetic drill of 138 children in Grades V A and VII A was reported by Brown (19), who found that practice with knowledge produced more continuous gains than practice without knowledge.

Forlano (32) compared the effects of individual competition and work for the group upon cancellation tests given thirty-four eleven-year-old children. The average child was found more highly motivated by the possibility of personal gain than by the incentive of helping his class or team score.

Mental Hygiene and Academic Progress

It has long been recognized that various factors besides ability affect schoolwork and make inaccurate prediction of school marks from intelligence tests alone. Stagner (69) reported correlations of some eight personality tests with academic grades and intelligence test scores, using college students as subjects. He concluded that personality factors have a definite influence on academic achievement. A bibliography of forty-five titles is included. E. G. Flemming (31) outlined a method of prediction of academic grades by a combination of intelligence test score, score on certain tests of emotionality and personality, and an estimate of emotional steadiness. Harris (33), in an analysis of results from 800 men entering the College of the City of New York, found that such factors as non-conformity in religious and other fields and extroversion were associated with school achievement lower than might be expected from intelligence test scores. An analysis of the relation of school success to introversion-extroversion in 120 primary-school pupils was made by Hendrickson and Huskey (36), who concluded that "it probably argues better for school success in intermediate grades to be ambiverted than to be either introverted or extroverted." A case study analysis of thirty-one students who had failed in secondary school

was reported by Karlan (42). The author concluded that emotional problems caused failure in students with high intelligence ratings. Counseling met with good success in these cases.

Character Education Methods

Several experimenters have attempted to investigate the formation of student attitudes. Kroll (43) administered Harper's scale for measuring conservatism-liberalism-radicalism to the boys in six twelfth-grade classes in history and English at the beginning and end of a semester. Three of these classes were being taught by teachers who were rated as conservative and the other three classes were being taught by teachers rated as radical. From data so gathered, the author concluded that "there is little foundation for the statement that conservative teachers indoctrinate conservatism. There seems to be some basis for the opinion that radical teachers are probably teaching the pupils to question the status quo."

Lichtenstein (48), using as subjects 900 children in the intermediate grades, attempted to determine the effects of stressing for a year in the teaching, two attitudes: (a) appreciation of outdoors, specifically in preference to moving picture shows; and (b) the so-called "scientific attitude." It was found that superstitions were reduced by the experimental procedure, but scientific attitudes and the preference for movies over outdoors, were not affected. Chen (25) attempted to measure the effect a single propaganda lecture produced on attitudes of college students. He found decided shifts of attitudes for or against the Japanese Manchurian policy.

A program of sex teaching developed by the Cincinnati Social Hygiene Society in cooperation with the Cincinnati schools, was discussed by Strain (71). Lectures on the physical and social aspects of maturation and reproduction are given to seventh- and eighth-grade children, and a more extensive course which includes talks on marriage and sex education of young children is provided for girls in senior home economics classes. Butler (22) investigated, by means of tests, the needs of 1,586 high-school students in understanding of child development and family relationships. A program was then set up involving the use by the students of observations of life situations, as well as reading materials, lantern slides, motion pictures, and photographs. Comparison of pupils given the program with control groups indicated significant gains not only in knowledge but also in self-reliance as measured by an attitude scale.

CHAPTER III

Community Influences

THE EFFECTS OF COMMUNITY INFLUENCES upon the mental health of any individual depend upon the mental stamina of that person. Thom (214) says: "There are, at any given moment, a vast number of individuals who are carrying on with apparent success, but who are just on the verge of an incapacitating illness. . . . There is probably for each and every individual a limit to the physical strain and the mental stress that he is capable of withstanding without reaching the breaking point."

Latham (150) went further and stated that the determining factor in personality development is not the influence of the environment but the attitude of the individual toward the environment. That these attitudes are, nevertheless, the result of interaction with environmental influences was pointed out by Künkel (149) and Levy (152).

The relative emphasis given to the attitudes of the individual and to environmental influences varies with writers. C. M. Campbell (100) and Blatz (94) stressed the significance of the child's attitude, while Lewin (154) stressed the environment in his analysis of some of the forces which operate in child behavior and development.

Family Influences

It has come to be fairly agreed that the most significant forces in mental health are those which operate early in childhood and that family influences rank first in importance. The present researches in this connection are devoted chiefly to isolating the significant forces in the family environment and in determining the manner of their operation.

In reporting upon the White House Conference on Child Health and Protection, Burgess (97) pointed out that the externals of home life are not nearly so significant as personal relationships in their influence upon personality development of children, that the good home is not to be measured in terms of economic conditions, neatness, parental status, or parental control, but in terms of human responses.

These pronouncements seem to be substantiated by extensive studies made by Francis and Fillmore (124, 125). They reported a statistical investigation in which one group of thirty families from a wealthy area and another group of thirty families from a middle-class area were analyzed. They computed biserial correlations to discover any possible relationship between good and bad environmental factors and the personality adjustment of the children in the families studied. The environmental factors having apparently little or no statistical significance as to their influence on personality were nativity of parents, esthetic standards of the home, hygienic conditions

of the home, economic status of the home, broken homes, and unsupervised play space. Those environmental influences having significance were recreational clubs and the health of parents.

They found that the following parental attitudes had a statistical significance in relation to the child's personality: the parents' knowledge of schoolmates; the parents' knowledge of the child's games at school; the parents' attitudes toward the mixing of the sexes, toward discipline, toward the child's health, and toward education; the entertainments favored by parents; and employment of the parents.

Those attitudes of the parents which had little or no statistical significance as to their influence on the child's personality development were the parents' attitudes toward recreational facilities in the home, control of spending money, sex instruction, and the time spent with the children.

In other words, physical environment by itself was shown to be of comparatively little importance, whereas a number of the parental attitudes appeared to be significantly influential. Thus, the factors originally thought to be important, namely, poor economic conditions, broken homes, foreign-born parents, and physical sickness, had little effect on their own account. They found a tendency for harmful attitudes of parents to produce maladjustments in their children and for helpful attitudes to do the reverse. They concluded: "In each succeeding generation the importance of parental attitudes upon the child is paramount, and the influence of the social environment is felt through this channel rather than directly. Further, emotional swings are handed on from generation to generation in the same fashion, thereby forming a heritage to the child upon which the social environment can have little effect directly."

Most of the statements that can be found in current literature concerning the specific effect of various parental attitudes on the child are generalizations from case histories or general clinical observations. Stone and Hart (212) made a study of the first 100 mental cases at the maternal health center in Newark and found that at least half included anxiety neurosis in the wife, most of which resulted from a fear of pregnancy. They advocated a wider dissemination of contraceptive information to avoid this condition.

A study of the home conditions of 40 manic-depressive and of 68 dementia praecox patients revealed that a large proportion of the homes had unwholesome emotional conditions of one type or another (220).

A variety of suggestions are offered as to the type of home situations which are harmful and as to what should be done to improve them. Some of these offer speculative hypotheses which could well be tested. Most of these speculations are derived from psychoanalytic interpretations and not from experimental, statistical, or case history technics (123, 185). Some of these speculations are very pessimistic. For example, Crichton-Miller (109) asserted that the only solution is for teachers to be able to educate out of the child the mistakes made by the mother and father in the first five years.

Since the assumption is made that maladjustments in parents are influential in the personality development of children, the research of Johnson and Terman (144) in connection with the personality characteristics of happily married, unhappily married, and divorced persons is very timely. Outstanding traits of the happily married are emotional stability, social adaptability, conservatism, and tolerance. The unhappily married give evidence of neurotic and introvertive tendencies. Divorced women are self-reliant, independent, tolerant, and manifest initiative and vigor. Divorced persons, both men and women, have more intellectual interests than married persons.

These findings suggest that the most unfortunate home situation, so far as the mental health of the child is concerned, would be a home which, although externally intact, is filled with emotional discord.

In this same connection, Silverman (206) examined 138 children who were placed by a child-placing agency because their homes had been broken. It was found that there was no significant relationship between the homes broken through delinquency and incompatibility of the parents, and the behavior of the children. Where problem behavior occurred it was related more to the subtle emotional relationships than to the overt delinquencies of the parents.

Clinicians are agreed that treatment of a problem child without the cooperation of the parents is likely to prove fruitless (91, 157, 169, 221, 227), and that it is often more necessary to treat the parents than it is to treat the child.

Changing parental attitudes—To what extent can parents' attitudes be changed? As a preliminary to the answering of this question, it is important to develop a reliable and valid scale for measuring attitudes. Peterson and Thurstone (182, 183, 184) have contributed to the technic for measuring attitudes, although their work was not done in connection with the attitudes of parents toward the care of children. A number of investigators have constructed attitude scales for parents (89, 90, 91, 140, 211), but Stogdill (211) seems to have done the most elaborate study of the significance of such a scale. He used an attitude scale consisting of sixty items, having each item rated on a ten-point scatter, according to how seriously or unfavorably the rater believed the behavior of the parent to affect the child. Child guidance specialists (fifty in number) regarded as relatively more harmful those forms of activity on the part of parents that tend to cause the child to lose confidence in human beings and to feel a lack of security in his environment, such as scolding the child for asking questions about sex, telling the child that God sees everything he does, praising him for being such a quiet child, expressing passionate love toward the child, and telling the child the stork brought him. Parents, on the other hand, regarded as relatively more harmful those forms of parental activity which allow the child a certain degree of aggressiveness, independence, and freedom from moral repression, such as using profane language in the child's presence,

finding fault with accepted conventions, allowing him to make his own mistakes, answering his questions about sex with the facts, finding fault with food in the child's presence, walking in on the child in the bathroom, and making the child angry.

Ojemann (176) and Fitz-Simons (120) made similar studies. Ojemann used 319 statements or generalizations relating to child development and had them rated by competent judges on the basis of the importance of each generalization for parents of preschool children, elementary-school children, and high-school students.

These studies all stressed the importance of parental attitudes and indicated some of the attitudes which should be changed, but the method that is best suited for changing parental attitudes has still to be discovered. A teaching program based on the findings of experimental studies was proposed by Hedrick (140) and class study with parents was tried by Cushing (110). A number of books for parents have been published which attempt to put in popular style the opinions of mental hygienists (136, 170, 172, 178, 190, 194, 222).

The child's attitude toward his parents—While the attitudes of parents toward their children and the emotional adjustments of parents are considered important, it has also been recognized that the attitudes of the children toward their parents may have significance. Indeed, the more important for the child's mental health is, in the last analysis, his attitude toward his parents rather than their opinions on child training. Simpson (207) studied the preferences of young children for mother or father. She used several technics, such as asking questions, getting responses to a set of pictures, reactions to stories, and the narration of dreams. She found that, in the main, the mother was preferred.

Stagner and Drought (209) developed an affection-aversion scale, using the Thurstone technic, and gave it to a number of college students, comparing their scores on this scale with self-ratings and biographical data. They found no reliable differences between the attitudes of men and women toward their fathers and mothers and suggested that these results are evidence against the validity of the Freudian theory of the Oedipus complex. They qualified this conclusion, nevertheless, by saying that the contradiction is more apparent than real. Taken together these two investigations suggest that the attitude of the child is the result of the type of treatment he has received at the hands of his parents rather than any fixed relationship due to sex.

Meltzer (168) developed a free association technic for use with young children to determine their real attitudes toward their parents as contrasted with the conventional attitudes which the children are likely to manifest. His method consisted of giving a child instructions to "think aloud" on different ideas, the idea of mother and father being included in the list of topics. Valid and reliable estimates of the child's parental attitudes were obtained by a technic for evaluating the child's responses which Meltzer described.

Feelings of security and independence—A number of studies point out the importance of feelings of security in the home and, at the same time, others indicate that this security must not lead to overdependence. Rosenheim (198) gave five cases to support the theory that attitudes of overprotection and rejection play important roles in child maladjustments. Myers (173), by means of a questionnaire of 114 items, evaluated the various factors of the home environment of high-school pupils. She found that unquestioning obedience demanded by parents was associated with good adjustments of younger children but with poor adjustments of older children. Fitz-Simons (120) constructed a guide which may be used clinically to determine the degree of attachment of the parent for the child.

While most clinicians agree that the child should be taught to gain freedom from excessive parental supervision as he matures, there is some feeling that too much freedom is dangerous. Several studies have attempted to throw light upon this question.

Ford and Balen (122) made a statistical study to determine whether the lack of supervision of boys would affect delinquency rates. For three months all the boys studied were under supervision during recreational play. After the initial three-month period, some of the boys were continued under supervision while the remainder were unsupervised. A comparison of the two groups showed no evident effect upon the delinquency rate of the unsupervised group.

In a social and medical study of thirty hyperactive children, Childers (105) found that the feeling of insecurity plays an important part in producing disturbances in children. It is urged that the hyperactive child be given as much security as possible, that he be placed in a régime of curtailed activities, that regularity be stressed, and that suppression be avoided.

Size of family—Levy (153) made a study to test the thesis that size of family and ordinal position within the family are factors in determining behavior deviations among children. He found that behavior difficulties were independent of the size of the family. He found also that an only boy in the family and the second child seemed to be more likely to become involved in delinquencies in rich, small communities. Hence, the ordinal position seems to function only when it obtains in connection with other factors. Maller (162) found that the size of the family correlates negatively with intelligence, moral knowledge, cultural background, and honest behavior. The relation was curvilinear and not linear, the only child not being superior to others.

An excellent review of the literature on the personality adjustments of only children was given by A. A. Campbell (98). He pointed out that the armchair theories continue to stress the importance of the only-child constellation as a personality determiner at the same time that research, both clinical and non-clinical, has given increasingly little support to this importance.

Witty (224) found, in a statistical study of 153 only children of five years of age in Kansas City, that the only child shows himself superior to other children in health, physical development, intelligence, and character traits. In later studies, Witty (223, 225) made numerous comparisons of only children with other children and found that, in social and emotional adjustments, there were no significant differences.

Foster parents—What effect have stepmothers on the mental health of children? Neumann (174) had 489 eighth-grade pupils write essays upon the subject of stepmothers. Thirty of the children were stepchildren. He found that half of the latter, 16 boys and 14 girls, indicated an unfavorable attitude toward their stepmothers. The stepmother, he pointed out, is in an unfortunate position and such antagonism is the result of preconceived notions rather than in any inherent characteristic of the stepmother situation.

When the child is adopted into a foster home the situation is likely to be more favorable. Dudley (114) and Leahy (151) studied the characteristics of foster homes and of foster parents, but their analyses throw little light upon whether foster homes are favorable or inimical to the mental health of the adopted child. Dudley contended that the difference between a good and a poor foster home lies in the degree of security which the home gives to the child.

Rogers (197) tried an experiment to see whether boys who had become delinquent, presumably because of faulty home structure, could be trained to become normal personalities. He took ten bad boys and, by seeing that they gained security and personal recognition in selected foster homes, made them into normal, law-abiding boys.

Inspired by the work of Mrs. Walrath of the Cradle Society, in Evanston, Illinois, Gallagher (127) presented in book form the various aspects of child adoption. Its aim seems to be to create in the lay individual a different attitude toward foster children. Doubtless, the mental health of the adopted child depends upon the attitudes of the adoptive parents and the others whom he contacts during his life.

Play and Recreation

More research needs to be done to determine the exact significance of play and recreation for mental health. Emery (117) gave a typical discussion of the value of recreation for hospital patients, asserting that dancing is one of the best socializing influences. He gave no evidence to prove that recreation is better than occupational therapy in the form of serious work for patients. Reeves (191) reported an attempt to promote street play in twenty cities. He stated that, in 1929, 36 cities closed 165 streets for play under leadership. Attendance at 105 of these streets was reported to be over 720,000. Kaplan (146) found that the organization of street play reduced delinquency. Pendry and Hartshorne (179) described 49 present-day organizations which devote their energies to providing recreation and leisure-time activities for young people.

We may conclude from the emphasis given in the above studies that play is valuable for patients in hospitals and that it keeps idle persons occupied and thus diminishes delinquency; but we may also ask whether there is any evidence that recreation plays an important role in the mental health of the normal, employed man.

Thisted (213) attempted to answer the question as to whether participation in college athletics had any deleterious effects. He obtained replies from 500 alumni to a questionnaire and attitude scale and concluded that athletes were as successful as non-athletes in their vocations, and that college athletics had been of personal value to the athletes.

Hardy (135) studied the relationship between out-of-school activities and the personality adjustments of children. She obtained her estimate of adjustment from teachers' ratings, observations, pupil interviews, and parents' reports. She found that attendance at movies, organized recreational and educational activities, the size of play units, and the types of play were not related to personal adjustments. She made the rather sweeping generalization that "what children of elementary school age do with their after-school hours is not an important conditioning factor in their personal adjustments."

Economic Depression

Gaudet and Curry (128) presented graphs (no correlations were computed) to show the relation between business conditions and first admissions to the New Jersey State Hospital at Greystone Park, New Jersey, for the years 1895 to 1930, inclusive. During every period of prosperity (with minor exceptions) there is a decrease in the number of first admissions, and, in every period of depression, there is a corresponding increase in the first admissions. They contended that their graphs support the claims of hospital superintendents and clinicians that, during business depressions, a greater amount of mental illness appears than during business prosperity.

Other studies indicate that this relationship is not so apparent. A questionnaire was sent to hospital superintendents during 1933 and 1934 by the National Committee for Mental Hygiene to determine in what way the economic crisis had affected these institutions and to learn how they were functioning under depression conditions (141, 148). Most state hospitals reported that there was an increased number of first admissions and depression was a precipitating or contributing factor to this increase.

Pollock (187) compared the populations of mental hospitals in New York state from 1929 to 1934 with the populations from 1924 to 1929. The rate of first admissions has been rising since 1924. The populations of hospitals increased more rapidly from 1929 to 1934 than from 1924 to 1929. This increase was greatest in 1933. The trend in the manic-depressive group has been slightly upward with a marked increase in 1933. A significant increase in the rate of dementia praecox admissions has occurred since 1927,

the rate being exceedingly high in 1932 and 1933. Pollock pointed out that the increase in the year 1933 may be due to the cumulative effect of the depression. Taking his figures as a whole, he concluded that the economic crisis does not seem to be the dominant factor in the increase of first admissions in any one diagnostic group; it is, however, a precipitating factor of importance in all groups.

It would seem that the increase in state hospitals, if these studies are representative, is partly due to the fact that fewer persons are able to afford the luxury of private sanitariums and partly due to the fact that hospitals provide a refuge for those on the borderline of a breakdown when economic stresses become acute. This interpretation is supported by the reports of superintendents that there was an increase in senile cases during the depression (presumably because their relatives could no longer support them) and that it was more difficult to parole patients. In other words, the state hospitals provided an economic haven and changes in hospital populations should not be interpreted to indicate that the economic depression caused mental diseases.

Statistics dealing with the type of cases applying for admissions to New York institutions, presented by Malzberg (163), indicate that they are more influenced by social and other environmental factors than by the degree of mental health or disease of the community.

The effects of economic depression upon the psychoneurotics is not discernable through statistical studies and all the writings bearing upon this point are expressions of opinion or generalizations from clinical evidence. It is contended that the psychic life of a people contracts with a narrowing of economic scope (201); that there is a decrease in family solidarity with a lowering of the economic level (92); that poverty builds in children feelings of insecurity which result in vagrancy and delinquency (201); and that revolutionists and psychopathic personalities are the natural outcome of the conflicts that grow from the breaking down of family ties, homelessness, and economic hazards (201).

A brief statement, summarizing the above studies dealing with economic depressions and their effect on mental health, might be in order. We have no positive evidence that economic depressions cause an increase in the numbers of persons who develop psychoses. The increase in population of state hospitals in depression years is greater than the normal expectancy, but this increase may be accounted for by the inability of relatives to care for the mentally ill either in private institutions or at home. New behavior patterns and new attitudes are evidences as a probable result of economic depressions, but these are in the direction of detrimental and disrupting behavior only in mature persons. In students, adolescents, and children such detrimental changes are not found. Since unemployment fosters feelings of insecurity, anxiety, and bewilderment, it is possible that economic depressions affect more those individuals already subject to such neurotic behavior than normal adults or immature children. More research is needed in order to discover the specific effects of economic depressions upon the psychoneurotic individual.

Motion Pictures

The strongest impetus given to research relating to the effect of motion pictures upon personality development was provided by the Payne Fund. Under the chairmanship of W. W. Charters (103, 104), committees were appointed to study various aspects of motion picture influence and, as a result of the research thus accomplished, twelve studies have been published. These studies cover practically every aspect of the motion picture influence, but it is hard to glean from them just what influence motion pictures may have upon the mental health of the community.

Freeman and Hoefer (126) tried an experiment to test the degree to which motion pictures may influence behavior. They gave instructions as to the care of the teeth to two groups of students. One group, in addition to the oral instruction, was given supplementary instruction by the use of models and diagrams, and by two pictures depicting social situations involving care of the teeth. The film group did worse on an information test than did the control group. In reported care of the teeth both groups were equal. In improvement of the condition of the teeth, the film group excelled slightly.

From a questionnaire study of 888 Los Angeles students, Seagoe (202) concluded that the primary appeal of the movie appears to be emotional rather than intellectual, and that any influence upon the child's conduct must be through the mediation of his emotions.

Peterson and Thurstone (184) showed pictures whose dominant theme dealt with such subjects as nationality, race, crime, war, capital punishment, prohibition, and penology. Their general plan was to measure the attitudes of a group of children by means of an attitude scale or a paired comparison schedule; to show the children a motion picture which had been judged by others to have some value on the issue in question; and then to measure the attitudes of the children again after the picture had been shown.

The most striking change in attitude which they found was the change in sentiment toward the Negro as a result of seeing the picture "The Birth of a Nation." The film "Son of the Gods" showed a definite change in attitudes favorable to the Chinese, and "Four Sons" made the children more favorable toward the Germans. "The Criminal Code" made a group more lenient in their attitude toward the punishment of criminals. The pictures "Big House" and "Numbered Men" in combination had a similar effect.

A group of high-school children were less favorable toward war after seeing "All Quiet on the Western Front." One group who saw "Journey's End" showed no change in attitude toward war; a second group showed a small change in the direction of pacifism. A group of high-school children were more severe in their judgment of gambling after seeing the picture "Street of Chance." The motion pictures used to study changes in attitude toward capital punishment and prohibition showed no effect on the children's attitudes.

It seems evident that pictures which have an adequate emotional appeal can change the attitudes of children. Furthermore, Peterson and Thurstone demonstrated that the change is a specific effect for each picture. It is foolish to generalize and to state that motion pictures have a definite effect in changing attitudes. It depends very largely upon the specific picture.

Holaday and Stoddard (142) measured the degree to which children are able to retain what they see in movies. They exhibited seventeen pictures in all and tested the children who witnessed them by means of true-false tests, four response multiple-choice tests, and ten-minute essays. They gave one-third of the observers the tests one day after seeing the picture; one-third of the observers they tested one month to six weeks after the showing; and the other one-third they tested two to three months after the showing. The general information of children and adults increased to a considerable extent by correctly shown information through the medium of motion pictures. General information presented incorrectly by the pictures was frequently accepted as valid unless the incongruity was quite apparent. Retention of specific incidents of motion pictures was high. The second-third grade group retained, on the average, nearly 60 percent as much as the group of superior adults. Action was remembered best when it concerned activities such as sports, general action, crime, and fighting; when it had a high emotional appeal; and when it occurred in a familiar type of surrounding, such as home, school, or tenement. The percents of retention found by these investigators surpassed to a large degree the percents previously obtained in learning experiments.

Dysinger and Ruckmick (115) studied, by means of psychogalvanic and pulse records, and by verbal reports, the emotional effects produced by motion pictures in children and in adults. While they reported definite emotional effects which vary with individuals, they were able to draw no conclusions as to the possibility that such emotional reactions were pernicious or beneficial in their effects upon the mental health of those who witnessed the pictures.

Renshaw, Miller, and Marquis (192) made an extensive study of the effects of motion pictures upon the sleep of children. Their experiments were very carefully done and provide a valuable contribution to the psychology of sleep, even apart from any light that they throw on the significance of motion pictures for mental health or ill-health. They found that some films do induce a disturbance of sleep in children which may be as great as, or greater than, the effect of ingesting from 4 to 6 grains of caffeine between the hours of 6 and 9 p. m. They give evidence to refute the theory that restlessness in sleep following exposure to motion pictures is due to the effects of the flicker of the picture. It seems to be the emotional effect which is operative, but no inference can be made as to which is the best type of picture for children to see. They suggest that the best hygienic regulations should limit attendance at certain types of films.

The experimental evidence seems to be very strong that motion pictures can affect children's attitudes, that they can be well retained, that they have an emotional effect, and that the excitement aroused by the picture may persist as would a drug stimulant. When it comes to evaluating the effect of pictures on the mental health of the child who witnesses them, not so much can be said.

Dale (112) made an analysis of the content of motion pictures. He found that three out of four pictures deal with crime, sex, or love. Love-making of an intense sort is seen in 70 percent of the pictures. Murder is the crime most often pictured. Vulgarity and drinking occur in two out of three pictures. The tone of the writer makes the reader feel that Dale believes the content has a bad influence, but he gives no evidence, except his opinion, that motion pictures are harmful to the mental health or welfare of those who view them.

Dale (111) also made a study of the attendance of children at motion picture performances. He found that more than one-third of the motion picture audience is under twenty-one years of age and that two-thirds of the attendance of children is in the evening. On the average, boys attend 1.10 times a week, and girls .88 times. Judging by the frequency with which the audience reviews the program, the comedy is the most popular part of the program, the main picture is second in popularity, and the newsreel, the third.

Blumer (95) made a study of the effect of the movies on the conduct of college and grade-school students. He collected his evidence from written narratives of motion picture experiences, from questionnaires, personal interviews, direct observation, and studies of conversations on movie subjects. He interpreted his results to indicate that imitation of movie situations, ideals, mannerisms, and modes of conduct is frequent and that attitudes, and notions of rights and privileges, may be implanted by witnessing motion pictures.

Blumer and Hauser (96) attempted to study the effect of motion pictures on the production of delinquency and crime. They conducted personal interviews and studied the autobiographies of young delinquents, ex-convicts, grade-school and high-school students. While they presented results to indicate that the motion pictures were an important factor in the delinquent careers of 10 percent of the males and 25 percent of the females, it would seem that these results should be accepted with great reservations. When a person is asked whether certain specific influences operated in leading him into misconduct, he is being tempted to evade responsibility, and the answer should be discredited.

Peters (180) made an elaborate attempt to measure the degree to which pictures conformed to or departed from the mores of the community. He devised scales for measuring the mores by having adults arrange described bits of conduct in hierarchical order according to "goodness" or "badness." These scales were then used to measure the "goodness" or "badness" of

the movies. Movies were found to oppose the present values regarding aggressiveness of girls in love-making; they parallel life from the standpoint of both approval and practices in respect to kissing; they surpass the mores in respect to democratic attitudes and practices; and, finally, they challenge admiration in respect to their treatment of children by parents. They found a negative correlation between the success of the films and their degree of offense against the mores.

Throughout the Payne studies one detects a militant tone. Presumably unbiased, the authors seem (with some exceptions) to be on the hunt for evidence with which to condemn the movies. The meager proof against the movies is evident when all the studies are related. There is no evidence that motion pictures are undermining the mental health of the community. The appeal of motion pictures is emotional, but that is no condemnation of them. They are intended to appeal to the emotions of the audience. They may effect changes in attitudes which are enduring. Such an instrument can, of course, be used unwisely; but the evidence seems to be that, in the main, the effects are not pernicious. The producers must conform fairly closely to the moral attitudes of the community or suffer the penalty of losses at the box office. It would seem more nearly correct to say that the content and tone of pictures reflect the mental life of the community instead of assuming that their influence is to arouse mental conflicts and to produce neuroses in the individuals who witness them.

Radio

Because no philanthropist has been generous enough to donate funds to promote research in connection with the radio, studies in this field are not numerous.

Robinson (196) tested the effect upon the opinions of the listeners of listening to four radio speeches on the subject of unemployment. He found that those ideas spread most rapidly which were already well established in the group, the changes being largely in the direction of strengthening the favorable judgments and decreasing the frequency of doubt.

Kirkpatrick (147) suggested that there is more responsiveness to radio programs among the lower occupational groups and those not so well educated, and possibly those of lower degrees of intelligence. The evidence for this opinion is not very conclusive.

Most of the research in connection with radio is in the direction of ascertaining the size of the radio audience and in analyzing the type of program to which people listen, as well as their reaction to programs of various kinds (101, 160).

Psychologists could well make use of the results of the investigations made by commercial organizations in order to carry out a program designed to tell us more about the effect of the radio on the mental health of the listener.

CHAPTER IV

The Normal Child

ALTHOUGH MUCH HAS BEEN WRITTEN about the mental hygiene of the normal, little of it can be termed research in the strict sense of the word. This chapter will indicate some of the more important discussions of positive mental hygiene as well as the few research studies which bear on positive mental health.

The first treatise on mental health from the positive point of view was Burnham's book, *The Normal Mind* (240). Burnham indicated his debt to James's *Talks to Teachers*, particularly the last three chapters on life's ideals. Burnham's book was the first of a series relating to mental hygiene which have come out with increasing frequency in recent years. It is impossible to mention them all. Shaffer (315), Symonds (332), Morgan (295), Kirkpatrick (285), Woodworth (345), Wallin (334), and Patey and Stevenson (300) have written on mental hygiene as psychologists. Sherman (316), Howard and Patry (278), Menninger (294), and Crawford and Menninger (247) have written as psychiatrists and Groves (267) has written as a sociologist. Jastrow (279) and Seabury (314) have written similar books in a more popular style for the general reader.

Shaffer (315) has the most extended treatise on the psychology of adjustment from the viewpoint of objective psychology, maintaining that behavior and adjustment may be explained by hypotheses familiar to experimental psychology. Symonds (332) discussed the mental hygiene of the normal child and applied the principles of mental hygiene to the situation. Wallin (334), Sherman (316), and Patey and Stevenson (300) wrote with the needs of educators in mind. These books include a number of helpful case studies. Books by Morgan (295) and Kirkpatrick (285) are designed primarily for students in college classes. Howard and Patry (278) and Menninger (294) wrote books on mental hygiene from the point of view of the physician and indicated the psychiatrist's point of view with respect to understanding of problems of adjustment. It may be added that the books written by those with different professional backgrounds are not clearly distinguishable in terminology or point of view. All apparently borrowed from certain commonly accepted principles which originally were associated with the psychoanalysis developed by Freud, conditioned response developed by Pavlov, the insight into problems of adjustment contributed by orthodox psychiatry, etc. Most of these books, however, found it easier to describe various types of maladjustment than adjustment and none hewed to the line of describing the normal mind better than those by Burnham (240, 241).

Mental Hygiene of the Young Child

The mental hygiene of the growing child has been discussed in chapters devoted to the topic in various treatises on child psychology and child development, among the more recent of which may be mentioned those by Goodenough (263), Gesell and others (261), Jersild (280), Stoddard and Wellman (320), Bühler (239), E. Dewey (250), J. E. Anderson (228), Hazlitt (275), Groves and Groves (268), Johnson (283), Norsworthy and Whitley (297), and Bott (236).

The books by J. E. Anderson (228), Foster (258), and Stuart (329) presented discussions of physical growth, the development and guidance of children and youth, and guidance through play and activity. Material for these books was gathered for the White House Conference on Child Health and Protection. The book by Norsworthy and Whitley (297) is a revision of an earlier book of the same title. The book by Stoddard and Wellman (320) kept to the line of research findings as closely as any. Goodenough (263) presented a clear picture for various levels or periods of development. Jersild (280) gave a psychological interpretation of the process of development. Gesell and others (261) wrote primarily of the development of the infant, basing his work on the exact development studies made in his laboratory at Yale.

Experimental studies of the development of emotional habits in young children have been largely devoted in the last few years to studies of the incidence of various types of behavior. Goodenough's study (262) of anger in young children summarized what was known in this field to the date in which she wrote. Subsequent studies on anger have been made by Ricketts (309). Caille (242) studied the incidence and development of resistant behavior. Jersild and associates (281, 282) and Hagman (269) made studies of the development of fears in young children. Jersild's studies are of particular importance because of their thoroughness and comprehensiveness. Jersild and Holmes (281) studied fears in children through observations in daily life by parents, the reports given by children themselves, the fears recalled from childhood by adults, and certain experimental and statistical studies of the origin and incidence of fear. These various methods of collecting data with regard to fear show a high degree of consistency. In this monograph a helpful summary is included in a final chapter giving practical suggestions on origin, utility, and prevention of fear. Heering (276) studied the incidence of thumbsucking. Levy (288) experimented with a litter of new-born dogs, feeding some with bottles having nipples with fine holes and others with nipples having larger holes. Keeping the amount of food constant, he found that there was more tendency to suck between feedings on the part of the dogs who had the small-holed nipples, indicating that thumbsucking may be due to defects in the normal process of obtaining food.

The mental hygiene problems of the normal child are reflected in the attitudes which parents and teachers have toward children's problems.

These have been revealed in a number of studies. Laws (287) and Wickman (342) indicated attitudes that parents and teachers have toward children's problems. More recently Bain (233), MacClenathan (291), and Yourman (346) provided supplementary data as to the attitude of teachers toward problems of children. Fitz-Simons (257), Koch and others (286), Ojemann (298), and R. M. Stogdill (322, 323, 325) studied the attitudes of parents toward their children's problems. These studies, according to a review by R. M. Stogdill (324), indicate that parents and teachers are highly conservative in their attitude toward children, approving behavior that makes for the smooth running of home and school, and showing little regard for wholesome personality development. Psychologists, on the other hand, find that active and extrovert behavior is better adapted to the social adjustment of children regardless of annoyance to teachers and parents. Psychologists, in general, emphasize freedom, while parents and teachers put more stress on submission and discipline.

Mental Hygiene of Adolescence

The mental hygiene of adolescence is discussed in a number of recent books on the psychology of adolescence, the more outstanding of which are those by Garrison (260), Garland (259), McCarthy (290), Conklin (245), Cole (244), Averill (232), Arlitt (231), Richmond (308), and Sadler (312). Cole (244) and Averill (232) devoted much attention to adolescent adjustments, illustrated with numerous case studies. Conklin's book (245) is more scientific in character with frequent references to the experimental literature on adolescent development. Garland (259) wrote from the point of view of the pediatrician. The book by the Sadlers (312) is very popularly written.

The period from 1932 to 1935 was characterized by the use of the questionnaire method in studying adolescent adjustments. Pintner and others (304), R. B. Smith (318), Maller (293), Washburne (335, 336), Symonds and Jackson (331), and Pressey and Pressey (306) made such studies. Pintner and others (304) devoted their work primarily to the elementary and junior high-school pupil. R. B. Smith (318) made a special study of inferiority feelings of high-school pupils and developed a scale for their measurement. Maller (293) specialized on the development of various types of instruments for measuring adolescent adjustment, including adaptations of the free association test, a test of persistence, a test of moral judgment, a test of honesty, and a psychoneurotic inventory. Recently he brought together the best items from all of these different tests into a battery which he calls the Case Inventory. Washburne's approach (335, 336) perhaps involves the greatest psychological insight of any of these studies of adolescent adjustments. He developed a questionnaire which measures such factors as impulse, self-control, rapport-alienation, sympathy, and happiness. Symonds and Jackson (331) reported an Adjustment Questionnaire which samples pupils' attitudes toward various phases

of their environment and used it in conjunction with behavior ratings for a study of adolescent adjustments. The Presseys (306) revised their X-O test and published a new test of emotional maturity which they call the Interest Attitudes Test to be used with junior and senior high-school pupils.

These investigators and others used these instruments for studying adolescent adjustments as related to school adjustment and to the problems of delinquency. Myers (296) investigated the relation between the school adjustments and various factors of the home environment. For the study of the home environment he developed a special inventory on intra-family relationships. In general he found that there was a distinct relationship between school adjustment and intrafamily relations. A subcommittee of the White House Conference on Child Health and Protection (340) made a significant questionnaire study of the factors in the family situation which condition the adjustment of the adolescent. Whitlow (341), by a questionnaire study, investigated the moral attitudes of high-school students and found that stealing, drinking, and lying are the cardinal offenses, although swearing, disobedience, and lying were most frequently admitted.

Mental Hygiene of Early Adulthood

On the college and early adult level a number of significant studies of the nature of normal adjustment have been made, beginning with G. Watson's study (337) of happiness among graduate students of education. Watson's procedure was repeated by Sailer (313), working with Y. M. C. A. members. Using a questionnaire with 300 opportunities for response, replies were received from approximately 500 young men. The reports indicated that those men who considered themselves happy also considered themselves above the average of the general population in happiness. The unhappy group considered dancing and card-playing as unimportant for happiness; they also considered religious worship and activities unnecessary. Physical handicaps appeared to be of more importance in causing unhappiness than nervous habits. It was noted that "only" children showed a greater tendency toward sociability than others. No relation between intelligence and happiness was reported, as very few of the intelligence tests sent out were returned. Hartmann (271, 272), in two studies at Pennsylvania State College, surveyed the adjustment problems among college students and the personality traits associated with variations in happiness. In the first study (271), one hundred sophomores submitted lists of not less than five and not more than ten major life problems. Vocation and personality development were high in all of the three methods of classification which Hartmann used. Sexual questions dropped to a low place in the importance index, while feelings of inferiority ranked high. Esthetic problems were largely absent from the list. In the other study (272) Hartmann attempted to find the personality traits associated with variations in happiness in a college population. With the possible exception of finding that

unhappy people were mildly inclined to be neurotic, most of the contributions were negative. However, several interesting relationships were tentatively suggested, although the correlations were low. Among these were: emotional health was the most *important* factor associated with happiness, but not the *sole* producer; the dominant person has a slightly greater chance of being happy than the submissive; the nature of ideals was an irrelevant matter; and no relation existed between interest in future career and happiness. Seventy-five percent of the group rated themselves as possessing happiness equaling or exceeding that of the average, which may be explained by the relatively sheltered existence of the college undergraduate. There was a disconcertingly low correlation between the self-rating of happiness and the ratings of associates, indicating disparity between attributed and experienced felicity.

Reinhardt (307) reported the problems most often mentioned in a questionnaire submitted to 147 women and 73 men students in a college freshman class. The difficulties listed in order of their importance indicated that nearly one-half of the students worried about certain matters not connected with school work. The need for a mental hygiene expert was indicated.

J. G. Patrick (301), by means of personal interviews and questionnaires, attempted to study the role of intimate groups in the personality development of college men. The subjects studied were exclusively male, white, native Americans, who had graduated previous to 1920. The intimate groups were divided into two types: (a) small groups such as the family and childhood play groups; and (b) larger groups such as the church, social group, and club. Some of the important findings were:

1. Intimate groups stand not only as symbols, but as major instrumentalities through which personality is attained.
2. The reactions to a small group of male friends persist as an enduring pattern resulting in a strong basis for predictability in the carry-over of these patterns from one to succeeding developmental periods.
3. There was indication of a desire to reconstruct intimate groups previously found satisfying, and where this was not possible a feeling of frustration usually appeared.
4. Students in small colleges as contrasted with those in large colleges spread their activities over a greater range of activities and a larger number of intimate groups, the social distance between students and faculty was less, the church was a more important element, and the students exhibited a more critical evaluation of their respective institutions. While the larger college offered greater intellectual opportunities the small college was more favorable to social development.

Stratton (327) studied the personal problems reported by 1,000 students in a graduate school of education. Major problems in order of their importance: (a) finance, (b) leisure and recreation, (c) part-time work, (d) placement, (e) social relationships, and (f) academic problems. The study indicated that students sought aid from college officials more frequently for academic problems than any other. Problems of leisure time and recreation were harder to solve than any others, while problems of finance, part-time work, and placement were being solved by 40 to 50 percent of the students.

From a survey of case records in a college psychological consultation service for a ten-year period, E. L. Stogdill (321) concluded that the problem as stated by the student is not always the problem needing clinical analysis, but indicates the student's insight into the difficulty. Four problems, personality defects, poor home adjustments, physical and social strain, were found to be closely connected as a group in a great many cases, regardless of the student's statement of his difficulty.

After studying the vocational fitness of 888 college students who had chosen vocations, Sparling (319) concluded that there was a great need for vocational guidance in college. While the group was not typical in vocational choices of college students in general, since a great majority had foreign-born parents and 95 percent desired to enter the four overcrowded professions of law, medicine, teaching, and dentistry, the data indicated that a majority of the students expected to enter a vocation in which they would have an intelligence handicap. There was little evidence of accurate information about the profession chosen, and 80 percent thought they would earn more than average salary in the field chosen.

A number of writers (230, 246, 256, 289, 299, 310, 311, 338, 344) have discussed the need and opportunities in college for mental hygiene, both remedial and preventive. V. V. Anderson and Kennedy (230), from their experience in a large commercial organization, estimated that 85 percent of the students in college showed some need for help in integrating their emotional life, while 10 to 15 percent were in danger of mental breakdown. Ruggles (311) and V. V. Anderson and Kennedy (230) pointed out that college mental hygiene programs should emphasize the possibilities to be achieved with every student in increasing happiness and efficiency, and not merely the treatment of the abnormal. The treatment of maladjusted students by deans and other college officers on the symptom level has led to general agreement that there is a great need for trained leadership in this field. Williams (344) pointed out that theoretical training for a college psychiatrist is not sufficient but must include clinical experience with normal individuals.

There is disagreement as to the place mental hygiene should occupy in the college organization. Livingood (289) and V. V. Anderson and Kennedy (230) asserted that the mental hygiene program should be located in the personnel department as an educational agency rather than in the health department as a health agency. This would have the added advantage of combining the counseling and advisory facilities of the college, not only for academic issues but for all life adjustment problems of the individual. However, Ruggles (310) pointed out that the psychiatrist should be located in the health department in order to get the close cooperation of the college physician. All records should be kept confidential and the mental hygienist should not attempt to be an educator.

Although no college is equipped to give individual guidance to all the students that may need some help in their adjustment problems, a great many difficulties may be cleared up through the giving of mental hygiene

or orientation courses (255, 292, 303). McKinney (292) drew an analogy between facts of mental hygiene and physical vaccination. By encouraging self-analysis and autosuggestion, the student was encouraged to understand that personality defects were not permanent but had causes and these causes could be removed.

Burnham (240, 241) and Morgan (295) have written books in non-technical language on the preservation of mental health, suitable for texts in a college mental hygiene course. Bennett (234) wrote a text to be used as the basis of a freshman orientation course. In addition to mental hygiene, such problems as wise distribution of time, efficiency in study, vocational planning, and love and marriage were discussed.

Strang (326) summarized the results of investigations relating to personnel work in a book intended for specialists and teachers.

Mental Hygiene of Middle Age and Senescence

The mental hygiene of middle age has not shared the experimental interest of recent years in the development of the infant and adolescent. Elliott (254) criticized modern education in its emphasis on individual development. While these goals may be useful criteria for adulthood, they prove themselves inadequate to the needs of middle life when waning physical energy and diminishing opportunity for active participation quite often lead to a feeling of frustration and defeat. Our presentday society has overlooked the contributions that older people may make in emphasizing the development of initiative and responsibility in young people at the expense of ideals of service. Education must have its aims remade to the purpose of helping the individual realize the other-than-ego values of self. "Satisfaction in later life involves, also, the individual's having developed goals of endeavor and found patterns of life sufficiently inclusive and dynamic to carry him through the whole of life." Jung (284), probably more than any other psychologist, has been interested in the problems and mental health of middle age. He has concluded that many problems of middle age are brought on by the inability of the person to reject the role of youth and cultivate his capacities for achievement at higher levels of satisfaction. The first half of life is concerned with the making of a living and establishing social contacts, an identification with the outer world. With middle age must come a liberation from this identification and an adjustment to internal realities, an "assimilation of the unconscious into the conscious self." This takes the form of realizing and developing individual traits and aspects of personality hitherto undeveloped and neglected. Jung also emphasized the importance of a religious point of view in realizing what life should mean.

Pitkin (305), in a popular book on the value of life after forty, pointed out that to live effectively after middle age one must have learned how to live earlier, that the period before forty should not be considered the most important part of life, but merely the preparation for the fuller and more varied existence that opens with the coming of middle age.

Sex Adjustments

Antedating the three-year period to be covered by this review, the three main pieces of research which have provided us with information concerning sex life of normal people are those by Davis (248), Hamilton (270), and Dickinson and Beam (251). There seems to have been little recent investigation or discussion of sex adjustments especially of the period from six years to adolescence. The trend in recent literature has been to point out the need for sane and wholesome sex education at all levels of development.

Dillon (252) studied the attitudes of children toward their own bodies and those of other children. The study was based on the observation of 38 children ranging in age from twenty-seven months to sixty-two months in a nursery school. The author concluded that the little sex play that was evidenced was motivated largely by curiosity. Manipulation of genitals appeared, but no sensory satisfaction was shown except in the case of one girl. Differences in sex structure were noted by the children but seemed to carry no sex significance. The older children appeared to have a more definite awareness and interest in their bodies, but in none of the children was there a sense of shame in appearing undressed before either adults or other children.

Groves (265) pointed out the serious sex maladjustments that may arise among college students due to the deliberate postponement of marriage. He concluded that colleges have the greatest need and best opportunity to distribute recent scientific sex information. E. S. Smith (317) undertook to ascertain the factors that were responsible for the unconventional behavior in twenty-five unmarried adolescent mothers. These data were collected by means of questionnaires and interviews and comparable material was gathered from 100 Girl Reserves. Both groups showed disappointment at the failure of the school in giving them sex information. The author stressed the duty of the school in giving special attention to a program of sex education which should include great concern and guidance in boy-girl relationships and adequate preparation of both students and parents for parenthood.

Several recent discussions have emphasized the importance of informed and well-adjusted parents and teachers in building healthy sex attitudes in children (235, 243, 249, 253, 266, 273, 343). Edson (253) warned parents that child and adult wants in sex are entirely different. Those training children must constantly put themselves in the child's place, to determine what his needs are, how he got them, and how they can best be satisfied. Groves and Groves (266) emphasized the importance of realizing that sex does not wait until puberty to become a force in life, but appears at birth and is the most influential factor in the formation of character. Hattendorf (273), from an analysis of problems presented by mothers in a study group in sex education, concluded that first questions about sex come in greatest numbers at four or five years of age, while the greatest interest in sex is shown by children between five and nine years of age. The earliest interest

is shown in organs of the body and in physical sex differences, then follows interest in babies and the process of reproduction. De Schweinitz (249) warned against the oversimplification of sex instruction, since information in itself has not been a solution. Too often sex instruction has been harmful because the parent approached the whole subject aggressively with varying degrees of tension, and overlooked the emotional implications involved. Sex should not be considered an isolated phenomenon, but as inextricably tied up in the conditions of the home. The author's formula was "Love them, set them a good example, and let them alone." Bigelow (235) concluded that the greatest good from sex education has come not from the content of courses, as much as the elimination of taboos and inhibitions formerly surrounding the whole field of sex.

Mental Hygiene in Industry

There has been in recent years a striking lack of research and investigation into the conditions that influence the mental health of workers. V. V. Anderson (229), from his experience in a large industrial organization, pointed out that the mental hygienist may be of very practical importance to industry by saving money and raising morale through reducing turnover and increasing production. Soviet Russia has been aware of the importance of the worker's mental health to efficiency and quality of production. Zacharoff (347) reported the two main avenues by which the Soviet Union has attacked this problem: first, by prophylactic psychiatry which aims to correct the mental and nervous complaints arising from industry; second, by vocational guidance which is primarily medical guidance. Granniss (264) estimated that 85 percent of all industrial accidents are caused by workers' mental attitudes. A person trained in mental hygiene in the personnel department of industrial organizations could uncover the causes of unhealthy mental attitudes and help to remove them. Hersey (277) compared groups of American and German workers. He found that happiness of the workers increased output 2 percent above normal while unhappiness resulted in a drop of 7 percent below normal. He further estimated that only half of the time were all workers in a healthy frame of mind. The author listed three conditions indispensable to mental health: having a goal; making progress toward the goal; and feeling that one is accomplishing something worthwhile. The enthusiasm of Russian and German workers exceeded that of American workers due to the former's greater feeling of worthwhile accomplishment. The author emphasized the employer's responsibility in providing medical and psychiatric service for his employees.

CHAPTER V

Behavior Problems and Delinquency

INVESTIGATIONS OF BEHAVIOR PROBLEMS, as related to the field of educational research, deal primarily with observation of behavior, the mental, physical and emotional characteristics of maladjustment, and methods of treatment, with special reference to prevention. Most of the earlier researches were confined to the problem of juvenile delinquency, in the belief that a knowledge of causes, with deflection of emphasis from criminal to educational implications, might lead to the elimination of much antisocial conduct. More recently the interest has shifted somewhat toward the study of behavior as an aspect of child development in general, with the result that delinquency as such is less often mentioned.

It is not known whether misbehavior in children is increasing or decreasing. Statistics of juvenile arrests and probation activities throw little light on this problem, because changing procedures and unstandardized terminology have rendered difficult the comparison of data for different localities, or even for different years in the same locality. While it is not unlikely that the increasing complexities of life have contributed to delinquency by giving rise to more varied opportunities for unsocial behavior, there has been increased diligence on the part of all agencies concerned with treatment and prevention.

The literature of this subject is vast, and many valuable contributions, of both extensive and intensive character, are available. Enough is known about problem children to serve as a basis for intelligent treatment. Some of the programs for prevention, based upon research findings, are obtaining promising results.

All general works on juvenile delinquency deal with mental hygiene aspects of the problem. Among the writers may be mentioned Healy (406), Burt (371), Fenton and others (390), Goddard (399), Reckless and Smith (437), Van Waters (464), Aichhorn (353), and the White House Conference committee (469).

Symptoms of Maladjustment

Types of misconduct—Until recently it has been the practice, in cases of juvenile arrest or detention, to designate the specific offense which led to the action. If more than one offense was charged in a given case, the principal offense was used for statistical purposes. The types of misconduct were described largely in terms of criminal behavior, and in many instances the same terminology was applied. A typical classification is that used by Healy and Bronner (404). In a summary (471) of 1,250 cases studied by the California Bureau of Juvenile Research from 1915 to 1923, the offenses, 14 in number, were classified in three groups, with frequencies as follows:

property, 47.8 percent; persons, 6.9 percent; peace and order, 43.5 percent. The individual offenses of incorrigibility, stealing, and truancy were most frequent, while those involving personal injury or damage to property were relatively infrequent.

During the progress of the study just referred to, Clark (378) devised a scale for grading juvenile offenses, through the use of which the seriousness of a given child's conduct was indicated by the "delinquency index." The offenses appeared in the scale, in order of seriousness, as follows: truancy, incorrigibility, vagrancy, malicious mischief, drunkenness, stealing, burglary, larceny, forgery, assault, sex immorality, arson, highway robbery, murder. Each offense was judged on a scale of ten points, the composite score being the delinquency index. For the California boys measured by the scale, Clark found indexes ranging from 0 to 39 points, with a median of 14 points. He considered an index of less than 10 to be of little consequence; indexes of 10 to 20, characterizing about 55 percent of the cases studied, were considered "typical cases of juvenile delinquency"; while an index greater than 20 was interpreted as representing serious misconduct. A revision of the scale was offered by Mursell (425).

A more recent study (397) of 983 Boston juvenile court boys gave the following classification and (overlapping) frequencies: truancy 64.1 percent; stealing, 51.4 percent; "bunking out," 48.9 percent; sex delinquency, 13.4 percent; excessive and frequent lying, 12.5 percent; while 7.3 percent "were known to have indulged in various forms of misbehavior such as repeated disobedience, drinking, marked cruelty, and the like."

Fenton and others (390) found twenty-nine separate offenses in the case histories of 400 delinquent boys in California, various forms of stealing and truancy being most frequent. He found that 35 percent of the boys had been involved in the theft of automobiles. His classification includes several items which are not usually listed as offenses of delinquents: school problem, destruction, inadequate home, cruelty, excessive smoking, fighting, failure in foster home, bad companions, fits of temper, nuisance, and excessive movie-going.

In the case of delinquent girls, sex offenses lead in frequency. Where other offenses occur, they are likely in some way to be associated with sex conduct.

Studies of problem children who are not considered delinquent tend to use similar, but less specific, classification of misconduct. Paynter and Blanchard (435) found the predominating behavior difficulties in child guidance clinic cases to be stealing, truancy, sex experience, and disobedience. They also included as behavior difficulties speech defects, bullying, and temper tantrums. In behavior cases occurring in the same family, Weill (467) found that disobedience, temper tantrums, food capriciousness, enuresis, destructiveness, restless sleep, and masturbation are most frequent. Weill's list included thirty-five forms of misconduct, with stealing and truancy relatively low in frequency.

Ackerson (348) made a comprehensive study of the behavior difficulties of 5,000 children, from which a group of 154 cases were selected for inten-

sive study of personality and conduct. The traits were considered in relation to age, mental level, personality-conduct-total, and their predictive value.

Wickman (470) had lists of behavior symptoms rated by teachers and mental hygienists, finding much disagreement as to the relative importance of some traits. Studies by Haggerty (402) were based upon extensive samplings of school children. Olson (433) offered a method of measuring problem tendencies, and later (430) described their clinical use.

Valuable descriptions of individual forms of misbehavior, considered in the light of related factors, are to be found in case studies, among the first of which were those reported by Healy (406). The Joint Committee on Methods of Preventing Delinquency (410), in one of the early reports from the child guidance clinics, told the story of three problem children, including detailed descriptions of behavior. Baker and Traphagen (360) reported seven illustrative case studies, each rated on the behavior scale.

Haggerty, Olson, and Wickman (401) devised behavior rating schedules, especially applicable to young children, in which the occurrence or non-occurrence of each of a series of behavior characteristics is checked by the rater. Norms, based on more than 2,000 children, were made available.

An elaborate study of delinquent behavior symptoms, with an attempt to predict outcomes, was made by Casselberry (374). The study resulted in the adoption of a battery of tests for the prediction of reform, designed for the use of courts and institutions. The sequence of juvenile offenses was investigated by Burkey (370), who found that normal children are most likely to begin their delinquencies by running away.

Armstrong (357) investigated the cases of 660 runaway school boys between seven and sixteen years of age. The chief motive was escape from some emotional conflict with family or school or from some excessive burden of responsibility.

Emotional and mental characteristics—Healy (406), who pioneered in the laboratory study of delinquents, denied having "the slightest inclination to place delinquents as such in the list of abnormal individuals." However, his investigations revealed that certain mental and emotional abnormalities are closely linked with misbehavior, and his case studies, together with his general conclusions, stimulated much of the early research along this line. In a later study Healy and Bronner (404) pointed out that "the mentally abnormal among delinquents constitute a much greater proportion than is found in the general population." Of the 4,000 cases studied they found 72.5 percent to be "definitely normal."

Glueck and Glueck (397) found their delinquent children of considerably lower mentality than a comparative group of public school children, with an "excess of dull, borderline and defective individuals." Their further analysis of the mental condition of this fairly typical group of approximately 1,000 delinquents revealed "a question of mental abnormality" in 47 cases; 3 were definitely psychotic; 39 constitutionally inferior; 19 psychopathic personalities (e.g., egocentrics); 13 were designated as "pe-

culiar" personalities; 10 showed epileptic characteristics; 5 were diagnosed as psychoneurotics; 70 showed marked adolescent instability; and 350 manifested an abnormal degree of various deviant personality characteristics such as impulsiveness, oversuggestibility, marked sensitiveness, etc. They further stated that none of the foregoing characteristics or traits was found in 44.3 percent of the 1,000 cases. Their general conclusion is that three-fifths of the children had "marked emotional and personality defects."

Ackerson (349) found personality and conduct traits closely interwoven, although each of the two types of problems has its own peculiar patterns. Paynter and Blanchard (435) emphasized the importance of observable personality characteristics on the ground that they are as likely to lead to vocational and social maladjustments in maturity as are the overt behavior disorders which are forced upon the attention of teachers.

Many recent writers take the psychoanalytic view that delinquent behavior is closely bound up with restriction and renunciation of instinct. Alexander (354) contended that criminal behavior is acquired when these conflicts are unresolved. Personality, as expressed in social participation, is associated with delinquency, according to the findings of Atwood (359), who scored matched groups of 100 delinquent and 100 non-delinquent boys twelve to sixteen years of age in this respect. At every age except twelve the delinquents scored higher (meaning more participation) than the non-delinquents.

Boynton and McGaw (367) submitted a list of some forty traits which, in the opinion of teachers, are most likely to cause children in the fifth and sixth grades to be considered problem cases. The average number of undesirable traits for a child was 7.23. Among these are many personality traits, such as inattention, carelessness, sullenness, lack of interest, overactivity, quarrelsomeness, "cuteness," stubbornness, shyness, and suggestibility. The conclusion was reached that subtle personality disturbances are more symptomatic of potential delinquency than are infractions of school discipline; but that teachers are concerned disproportionately with behavior related to classroom disturbance.

Courthial (380) used a series of tests to study the emotional reactions of delinquent girls, with the finding that they are less well adjusted socially, and suffer more feelings of physical discomfort, than do non-delinquent girls of matched age, intelligence, and environment. Laslett and Manning (415), after applying the Laslett test of delinquent tendencies and the Murray psychoneurotic inventory to 332 high-school pupils, found no significant relationship between delinquent tendencies and emotional maladjustment. Moore (424), in a comparative study of 150 problem boys and normal children, found the former to be less stable emotionally, with indications that certain antisocial deeds of apparent bravery are merely compensatory reactions for an underlying fear.

The personal attitudes of delinquent boys were investigated by Reusser (440) who found them more critical than the average boy and less critical of themselves than were non-delinquent boys of similar age, grade, intelli-

gence, and socio-economic status. Mental conflicts in behavior cases were described clinically by Healy (407).

Methods of observation—Prior to the development of clinical technics there were no reliable methods for observing the characteristics of behavior problem children. Reports of parents, teachers, and police officers were often inaccurate and prejudiced. The clinical method, introduced into the Chicago juvenile court by Healy (406), was soon accepted as a regular procedure by courts and institutions. Among the early reports of these technics are those of Bronner (369), Fernald (393), Kuhlmann (412), Weidensall (466), and Williams (473). More recent examples are those of Adler (351) and Fenton and others (390).

Methods of observation include (a) personal interviews; (b) testing; (c) studies of family and environmental conditions; (d) evaluation of school and home behavior; and (e) observations of parole or after-success.

A general discussion of methods and procedure used in the Harvard Crime Survey was offered by Glueck and Glueck (397). Casselberry (374) developed an objective method for the analysis of delinquents, based on tests and other forms of investigation. Ackerson (349) described a special technic for studying children's behavior problems. Anderson and others (355) set forth the procedures used in a typical child guidance clinic. Baker and Traphagen (360) prepared a detailed description of a new technic embodied in the Detroit Behavior Scale, with directions for its use. Olson (431) worked out a diagnostic method especially applicable to the study of problem children. Selling (445) and Doll (386) prepared handbooks for use in the examination of offenders.

Many studies are available in which intelligence and achievement tests serve as the basis for the investigation of delinquency. The current tendency is to utilize tests of non-intellectual traits, especially those related to emotional stability and attitudes. Fenton and Wallace (392) surveyed the use of tests in twenty-eight child guidance clinics. Haggerty, Olson, and Wickman (401) developed two schedules for the study of problem tendencies in children, with special reference to factors entering into maladjustment.

The test series of Raubenheimer (436) was planned to detect problem tendencies in the potentially delinquent. A new test of delinquency was described by Laslett and Manning (415) who showed its application to high-school pupils. An inventory of interests, especially applicable to child guidance clinics, was described by Wallace (465).

Most studies of problem children, even when based largely upon psychological tests, make use of case histories and other supplementary methods for the exploration of environmental factors. An excellent outline of case procedure is found in Glueck and Glueck (397). Williams (472) devised a method of grading home conditions, used for the study of the social backgrounds of delinquents, and the use of a similar scale for grading neighborhoods was reported by Clark and Williams (377). Records of after-success of delinquents were reported by Fenton and others (390). A report on the adjustment of clinic cases under a child guidance program was given by Davidson (382).

Prediction of delinquency—Attempts to predict delinquency are based largely upon studies of behavior symptoms in children who have not yet become delinquent, in the light of the early behavior of children who become delinquent. Ackerson (349) made a comprehensive study on the feasibility of inventorying children's behavior traits with special reference to the analysis of commonly recognized gross behavior patterns, most of which represent forms of maladjustment common to delinquent careers. Boynton and McGaw (367) found, in a checklist of forty traits in problem children, certain ones (inattention, carelessness, lack of interest in work, unwillingness to study, tendency to disturb classes) to be of such relative frequency as to suggest the further development of maladjustment. Burkey (370) found a predictive sequence of offenses; e. g., normal children who begin with truancy and incorrigibility take readily to stealing. Dickson (384) believed that teachers can be trained to recognize early symptoms of maladjustment, a view evidently shared by E. T. Glueck (396). The method proposed by Olson (432) is in a sense a prediction of further maladjustment. Speer (454) found the Bernreuter Personality Inventory to be of no aid in prediction of problem tendencies.

Causes of Behavior Difficulties

It is generally agreed that behavior difficulties cannot be attributed to any single cause or pattern of causes. Neither can such maladjustment be said to be solely hereditary or environmental. The patterns of causes, or, more properly, related factors, involve both constitutional and environmental conditions.

Constitutional factors—The situation with respect to heredity in delinquency has changed little since the early summary by Healy (406) in which he said: "The whole problem of human conduct is so complicated by environment and other genetic factors, that only now and then do we get satisfactory evidence of the part that heredity plays in the background." Investigations in California based upon extensive family history case work, revealed no evidence that delinquency, as such, is inherited (471). These studies and others of more recent date, however, show the relationship of behavior maladjustment to certain traits more definitely traceable to hereditary origin, feeble-mindedness, epilepsy, emotional instability, and nomadism. Healy reported cases of inherited excess energy, irritable temper, hypersexual tendencies, and certain physical characteristics, all of which appeared to be major factors in maladjustment. Fenton and others (390) implied doubt that heredity is an important factor, although pointing out that delinquents, on the whole, are of lower intelligence than unselected children, and that certain races contribute more than their proportion to the institutionalized delinquent population. Glueck and Glueck (397) offered no direct evidence of hereditary causation.

Environmental factors—Most investigators agree that environmental factors are potent in the causation of behavior maladjustment, although the

precise connection is difficult to establish. Francis and Fillmore (394) reported an extensive study of the influence of environment upon the personality of children. Sheldon (449) computed indexes for male delinquency and five variable social factors. Inter-tract correlations ranged from .51 to .75, with a multiple of .84. A small proportion of families contributed a large proportion of offenses. Healy and Bronner (404) included a large number of factors, chiefly environmental, in their summary of causation: bad companions, adolescent instability, early sex experiences, mental conflicts, social suggestibility, love of adventure, motion pictures, school dissatisfaction, poor recreations, street life, vocational dissatisfaction, and sudden impulse. Glueck and Glueck (397) and Fenton and others (390) also emphasized complex environmental patterns.

Physical conditions have not been found important; delinquents on the whole, are within normal limits physically. Healy and Bronner (404) found physical conditions of all sorts to be causally related to delinquency in only 5.6 percent of the cases. Christie (376) found little evidence of causal relation of physical defects. Molitch and Adams (422) found significant frequency of hearing defects among delinquent boys. Molitch and Eccles (423) found no significant deviation of delinquents in calcium metabolism. On the other hand, Timme (460) found a slightly higher incidence of physical defects among problem than among non-problem children. Tobias (461) found indications of syphilis in 14.2 percent of a group of delinquents, but made no attempt to show a causal relationship. Armstrong (356) found evidence that primogeniture is related to delinquency, in cases in which the offense is against the home, while Parsley (434) found nothing significant in the ordinal position of delinquent girls, or in the size of the family. Sletto (452) found no greater tendency to delinquency on the part of the only child and no significant relationship to ordinal position.

School conditions appear to be related to behavior maladjustment in numerous ways. Delinquent boys and girls are often retarded in school. Glueck and Glueck (397) found their cases considerably more retarded than the general school population of the same area, even when allowances were made for mobility of the families. Fenton and others (390) found that 47.5 percent of 400 delinquent boys were retarded by age-grade status, while only 2.5 percent were accelerated. The New York State Crime Commission (428) reported that truants, as a rule, disliked academic subjects and tended to fail, while they enjoyed and pursued successfully the shop subjects. Boynton, Dugger, and Turner (368) submitted evidence that the emotional stability of teachers is reflected in the behavior of pupils. Healy and Bronner (405) found school conditions often directly contributory to delinquency.

Home conditions of delinquent children have been extensively studied. Using the Whittier scales for grading homes and neighborhoods, Williams (472) found lower indexes for delinquents than for non-delinquents, but pointed out that delinquents sometimes came from apparently good homes,

and that even the bad homes contributed relatively few delinquents, considering the number of children in the family. Hodgkiss (409) found that 67 percent of a group of delinquent girls came from broken homes, while only 45 percent of a matched control group came from such homes. Glueck and Glueck (397) found the home broken by death of one or both parents in 26.7 percent, and by desertion, separation, or divorce in 18.8 percent of their cases. Fenton and others (390) found 59 percent of broken homes, against a normal expectation of 25 percent. Keogh (411) found relatively more broken homes in cases of runaway boys than in a control group. Maller (419) reported that of New York City delinquents, 39 percent of the boys and 55 percent of the girls came from broken homes. Approximately 50 percent of the families of a selected group of Wisconsin delinquents are receiving incomes below the health and decency living level established by Paul Douglas (372). The analysis indicated a direct influence of economic factors in the causation of delinquency. Gilmore (395) reported a study of five generations of a begging family, revealing a transmitted social pattern of behavior. Seagoe (444) found that presentday transient pupils commit more social acts than do other school pupils. Sullenger (457) found a relationship between economic status and delinquency, and an especially high delinquency rate among newsboys.

Reinhardt and Harper (439) compared the environmental factors of delinquent and non-delinquent boys, and found that the former had fewer club affiliations; came from larger families, from families of male dominance, and from mobile families; had fewer tools of culture (books, etc.); attended church less regularly; had older fathers, and greater disparity in parental ages.

Studies of delinquency areas reveal significant concentrations of behavior problems in different communities. The exhaustive investigation by Shaw and others (448) included maps showing such areas in Chicago, the ratio of delinquency varying inversely with the distance of the area from the business center of the city. He assumed that "delinquent behavior is very closely related to certain community situations which arise in the process of city growth." Maller (418) reported delinquency areas for New York City, Wilson (474), and Adler, Cahn, and Stuart (350), for communities in California.

Mental Aspects of Behavior Maladjustment

Results of intelligence tests—The use of intelligence tests with groups of problem children has resulted in extensive discussion and controversy. Originally a method of exploring what were believed to be basic factors in conduct, namely, intellectual concepts as related to moral judgment, such tests are now regularly applied wherever problem children are under observation. In his early studies Healy (406) used tests of his own devising together with other tests which were in process of standardization. Later studies were based largely upon Binet tests. A summary of these early tests, with results of testing at Whittier State School, was presented by Williams

(473). A summary including more recent work was given by Lane and Witty (414). Most of these investigations found delinquents to be of lower intelligence than non-delinquents, and the percents of mental deficiency were often large.

McClure (417) reported, for a group of Toledo juvenile court cases, a Stanford-Binet I. Q. range of 40 to 118, with a mean I. Q. of 79.34. Girls tested slightly higher than boys, and colored children slightly lower than whites. About 1 percent of the whole group classified as superior; 27.14 percent as borderline; and 24.92 percent as clearly feeble-minded.

Growden and Calhoon (400) found, in 1,104 admissions to the Ohio Boys' Industrial School, feeble-minded, 6.8 percent; defective delinquents, 14.3 percent; psychotic, 0.3 percent. Of 313 girls, 17.5 percent were classified as feeble-minded; 4.7 as defective delinquents; and 1.2 percent as psychotic. Rogers and Austin (441) showed a distribution of the intelligence quotients of 3,584 children from the juvenile court of Toronto, Canada. A normal frequency curve was indicated, with a mean I. Q. of 82.2. Correlations of first tests with retests ranged from .63 to .82, the highest correlation being obtained between tests given five years apart. Their classification was: superior, 1.96 percent; normal, 24.52 percent; subnormal, 59.72 percent; deficient, 13.9 percent. Selling (446), in a study of juvenile automobile thieves, found a median I. Q. of 83 with a range of 57 to 112. Snyder (453) used Stanford-Binet tests with 100 consecutive admissions of boys and 100 consecutive admissions of girls to the Pennsylvania State Training School. The average I. Q.'s were: boys, 71.25; girls, 71.46. The classification for boys was: normal, 8 percent; dull-normal, 14 percent; borderline, 28 percent; high moron, 35 percent; low moron, 15 percent. The classification for girls was: normal, 7 percent; dull-normal, 17 percent; borderline 31 percent; high moron, 33 percent; low moron, 12 percent. Lane and Witty (414) found 700 delinquent boys in the St. Charles (Illinois) School for Boys, by the Otis Group Test, to range in I. Q. from about 50 to about 129, the mean I. Q. being 87.96, the median 88.25. More than 80 percent were rated as being below average mental ability, and 10 percent as feeble-minded. Correlation of Otis and Binet tests of 145 cases was .84. The mean I. Q. of children from delinquency areas was somewhat lower than those from districts where delinquency is infrequent. In studies of behavior problems in high schools, Laslett and Manning (415) found a mean I. Q. of 105.8. Fenton and others (390) found Stanford-Binet tests to give a mean I. Q. of 91.7 and a median I. Q. of 90.4 for 393 delinquent boys at Whittier State School in California. It was pointed out, however, that subnormals have been largely eliminated or refused admission. His classification was as follows: feeble-minded, 4 percent; borderline, 15 percent; dull-normal, 29 percent; normal, 41 percent; superior normal, 8 percent; superior, 3 percent.

That the distribution of intelligence among the inmates of institutions for delinquents varies greatly with the institution policy concerning the admission and retention of cases was shown by Sullivan (458) in a com-

parative chart of the intellectual composition of Whittier State School in 1918 and 1926. During that time the mean I. Q. changed from about 82 to 91, the percent of feeble-minded from 29.9 to 2.2, and the percent of superior cases from 5.5 to 10.9.

Glueck and Glueck (397), in their study of 1,000 delinquents, classified 41.6 percent as normal or supernormal; 28.2 percent as dull; 17.1 percent as borderline; and 13.1 percent as feeble-minded. The relation of intelligence to specific types of misconduct was analyzed by White and Fenton (468) who found forgery to be the only offense significantly associated with high mental ability. Slawson (451) concluded that the deficiency of delinquents is mostly manifested in verbal intelligence and that in non-verbal intelligence such boys are on a par with non-delinquents. Doll (387), reviewing and discussing investigations in this field, concluded that apart from large incidence of feeble-mindedness, criminal intelligence is not inferior to that of the non-criminal population.

Results of achievement and aptitude tests—The educational retardation of delinquents as indicated by age-grade status is usually substantiated by achievement tests, although in individual cases the achievement is higher than would be indicated by rate of promotion in school. Sullivan (458) applied Stanford Achievement tests to 304 delinquent boys at Whittier State School, with the result that the group showed marked retardation in educational age and in all subject ages. The average retardation in educational age was two years, five months from chronological age, and one year, one month from mental age. There was less retardation in reading than in other subjects. In some cases Sullivan concluded that educational retardation was the main cause of the maladjustment. In the same institution, five years later, Chase (375) found mean achievement ratios to range from 80.9 (arithmetic computation) to 101.4 (paragraph meaning). Achievement in reading was consistently higher than in other subjects. Lane and Witty (413), in a study of delinquent boys, found their subjects more seriously retarded in educational growth than in mental development.

Paynter and Blanchard (435), using Stanford Achievement Tests and the Otis Classification Test, found problem children admitted to child guidance clinics to have educational quotients varying from 37.4 to 102, but concluded that there is no consistent tendency for such children to be of low achievement when all factors are taken into consideration.

In a study of mechanical aptitude reported by the New York State Crime Commission (429), delinquent boys were compared with their non-delinquent brothers. Although the former were of lower intelligence, they were superior to their brothers in mechanical aptitude, and even slightly superior in this respect to unselected children. Moore (424), however, found problem boys inferior in mechanical aptitude.

Mental disorders in behavior problems—Evidences of mental disorder, apart from mental deficiency, are recognized by many investigators, although varying methods of classification and diagnosis make comparison

of groups difficult. Healy and Bronner (404), in analyzing 4,000 cases studied in Chicago and Boston juvenile courts, found definite psychoses in 5.6 percent of the Chicago cases, and in 1 percent of the Boston cases. The lesser frequency for Boston was attributed to the better local facilities for the study of psychoses. Psychopathic personality, enumerated only for Boston, occurred in 2.8 percent of the cases. The frequency of epilepsy was 5.5 percent in Chicago and 1.6 percent in Boston. Glueck and Glueck (397) found, in 1,000 delinquents, "certain identical complexes of an emotionally-toned, obsessive, recurring nature," but none of these "mental mechanisms" in 86.3 percent of the cases.

Treatment of Behavior Problems

Provisions in regular schools—Educational facilities for problem children are surveyed in a *Research Bulletin* of the National Education Association (427), wherein it is suggested that such facilities "appear to be meager." The aspects of the problem stressed are, first, the making of special provisions for the potentially delinquent child, and second, the rehabilitation of children who have been dealt with by the courts.

E. T. Glueck (396) takes the position that inasmuch as the control of antisocial behavior involves the concentration of social forces and agencies, the elementary school should assume the responsibility for the early recognition of delinquency and participation in a treatment program. This view is shared by Dickson (384) who believed that teachers can and should be taught to recognize the symptoms of behavior maladjustment. Durling and Powell (389) advocated the more extensive use of special classes in the schools as a less expensive alternative for institution treatment, and more care in regular school classification on the ground that behavior difficulties are not so likely to occur in children whose work is of a difficulty commensurate with their ability. Sayles (442) gave examples of methods used in dealing with problem children in the school. A committee of the National Education Association (426) developed a plan for training teachers in this field. A relatively new and promising educational contribution is that of the visiting teacher (381). An investigation conducted in ten Minneapolis schools undertook to discover ways of improving the behavior of kindergarten children by observing types of activity and recording teachers' remarks about them (383).

Special schools—The segregation of problem children is effected in city school systems by the establishment of special institutions of the parental school type. These differ from most state correctional schools in that they are under the control of educational authorities, and are financed with school funds. State laws provide for twenty-four hour parental schools in Illinois, Pennsylvania, and California. In some instances such schools are maintained under private auspices. They are usually small and emphasize manual and prevocational work.

Examples of institutions maintained by city school systems, cited in a report of the National Education Association (427), include the Thomas A.

Edison School in Cleveland, enrolling about 1,500 boys who are educationally maladjusted elsewhere, and the Montefiore Special School in Chicago. The functioning and accomplishments of the latter school were described by Dolton (388).

The junior republic type of school, based on self-government, appears to have been successful in certain cases, although some doubt has been expressed as to the effectiveness of the plan. Thomas and Thomas (459) believed that self-government is a convenient device, but questioned its use in the treatment of delinquency, inasmuch as it allows children to depend on "a form of group approval which may have little extra-institutional force."

The work of state institutions for delinquent boys was described in a survey by Bowler and Bloodgood (365) who reported intensively on five institutions: Whittier State School, Whittier, California; Boys' Vocational School, Lansing, Michigan; State Home for Boys, Jamesburg, New Jersey; State Agricultural and Industrial School, Industry, New York; and Boys' Industrial School, Lancaster, Ohio. The work of institutions for girls was described by Reeves (438).

Fenton and others (390) reported on some of the recent developments at Whittier State School, in which the school program in all its aspects is correlated with the diagnostic work of the Bureau of Juvenile Research. Included was a stenographic report of a guidance conference in which various members of the staff participated and formulated recommendations for treatment. Semans (447) made a special study of the recreational program for younger boys at an institution for delinquents, and developed a plan for the improvement of this phase of institution work. Evaluations of the training programs of institutions were offered by Asher (358), Dobbs (385), and Caldwell (373).

Aichhorn (353), a Viennese, and a disciple of Freud, organized a school for problem children some of whom were especially difficult cases. His approach was that of psychoanalysis and his results were described largely in terms of changes in attitude and personality in individual cases. Adler (352) predicted that institutions will tend to specialize in the training of the more difficult cases.

Special segregation problems—One of the perplexing problems of schools for problem children is the proper care of the mentally deficient. While some of these can be transferred to institutions for the feeble-minded, the difficulties in the way of such transfers are great. Since the discovery that large numbers of delinquents are mentally deficient, there have been efforts on the part of most correctional schools to reject such cases, with the result that the percent of feeble-minded in correctional schools has steadily declined. Merrill (420) recommended special institutions for defective delinquents, to have the characteristics of schools with the security of prisons. Commitment should be indeterminate, with careful diagnosis and treatment and gradual adjustment to social situations of increasing complexity. It has been shown that subnormal offenders, despite difficulties

of training, can be so treated as to become reasonably well adjusted (450).

Foster homes—In a study of several hundred children placed in foster homes (408) it was found that the ratio of success with such treatment is high, especially attributed to the factor of removal from the disturbing sphere of influence. However, the success varies with mentality and personality, and it is recommended that foster-home placement be made only upon expert advice. Glueck and Glueck (397) found that 225 of their 1,000 delinquents had lived in foster homes, and agreed with the contention that such placement should be handled with great care, and in the light of diagnostic data.

Relationship to Courts and Society

Extent and distribution of delinquency—It is estimated that the number of children brought before the juvenile courts in the United States annually approximates 200,000, the number of boys exceeding the number of girls in a ratio of five to one (427). It is evident, however, that court cases constitute no index of the actual number of problem children for whom no reliable estimate is obtainable. Data from the Children's Bureau (463) showed that, in 1930 eighty-eight juvenile courts in the United States handled 50,000 cases, including 40,000 white and 10,000 colored children.

Juvenile court procedures—Referred to by Healy and Bronner (405) as "that notably American institution," the juvenile court has greatly extended its work and importance in recent years. An account of its scope and procedure was given by Lou (416), including history, organization, and special technic. Scott (443), viewing the problems of the juvenile court from the judge's bench, recommended that the work of the court should be based on consideration of the total individual in his setting. The function of the court is becoming increasingly preventive, although it must continue to deal with cases of advanced delinquency. It has been shown that although the juvenile court cannot fairly be held responsible for the failure of many of its cases, changes in the present set-up are probably necessary and research is needed to that end (403). In the field of probation S. Glueck (398) contended that we are in the wasteful stage of "extensive agriculture"; the equipment is inadequate, the personnel insufficiently trained, and both supervision and record-keeping are in need of radical improvement. Scientific methods alone offer a solution. Beard (361) gave data based on records of 500 children studied at the Judge Baker Foundation and later placed on probation by the Boston Juvenile Court. Success is measured in terms of preprobation conditions. Beckham (362), reviewing the range of jurisdiction of juvenile courts in the United States, concluded that the range of cases and authority of the court could well be extended.

Prevention of delinquency—It is generally agreed that delinquency is preventable, and that prevention requires the use of more research and guidance methods, and appropriate coordinated efforts of home, school, and community. A few years ago it seemed that a solution would be afforded by the twenty-four-hour school, and some states have enacted legislation auth-

orizing the establishment of such schools. At present the most promising lines of approach are the child guidance clinic and the coordinating council.

The child guidance clinic, established specifically as an agency for the prevention of delinquency, has grown rapidly in extent and influence. Stevenson and Smith (455), reviewing a quarter century of child guidance work, said:

Clinical service for child guidance gives effect, on a limited scale, to the best current thinking about the way to prevent delinquency and mental disease. While its failure to develop conclusive methods for measuring results makes it impossible to say definitely that it does prevent delinquency or mental disease, evidence of a subjective and personal sort, impressive in the mass, indicates that it can and does relieve specific tensions in children, free them from crippling demands, add to their happiness, smooth their way.

The work of a typical child guidance clinic was described by Anderson and others (355) who reported on the accomplishments of six years' work in Los Angeles. The working policy is summed up as follows:

The Child Guidance Clinic is a team. By pooling the knowledge, experience, and "conditioned reflexes" of trained workers in the fields of social case work, psychology, medicine, and psychiatry, it is possible to bring to the study and treatment of an individual child a combined intelligence which, when backed by enthusiasm and supplemented by the common garden variety of "horse sense" and aimed directly at finding an answer to the question "What can be done about it all?" should, theoretically at least, prove a powerful agent in solving the perplexing problems that are the daily grist of the child guidance mill.

The need for coordinated efforts was emphasized by Truitt (462), in an address to a group of psychiatrists:

Prevention of behavior problems is no monopoly of the psychiatric group, and the isolated efforts of this group involve a struggle against all sorts of undercurrents in the fields of industry, law, education, public health, housing, politics, etc. Psychiatry will operate in a vacuum until it can join forces with preventive work in other fields and evolve with them common methods of preventing difficulties which contribute to undermine public health—mental and physical. Our methods for preventing delinquency will be only partially effective so long as allied groups fail to understand our purpose and to see how our work may reinforce theirs.

Bowman (366) showed how community recreational projects, especially during the summer months, may be effective in the prevention of delinquency. He believed the problem is essentially an educational one, and that all social agencies in the community should coordinate their efforts to make the recreation program effective. "The home, where values normally group themselves about the effort to make life whole, should be an intimate part of the scheme."

The coordinating council was described by Fenton (391) as "the voice of the community expressing in action its ideals and aspirations, its hopes for the progress of human society." The movement in California originated in the city of Berkeley and in 1931 had extended to eighty-one communities in that state. The coordinating council consists of a group of persons representing various educational and social agencies in the community which assumes responsibility for the diagnosis, guidance, and treatment of

problem children. There is some evidence that delinquency is appreciably reduced in communities in which these organizations have been formed. Cooperative community efforts in an Indiana city are reported to have increased school attendance by 7.5 percent, and for eight months no new cases of delinquency were brought from that area to the juvenile court (379).

Other social problems found to be related to the prevention of delinquency are unemployment insurance (475), the economic depression (364), and race attitudes (363). Beard (361) recommended measures of the following order as being most promising for communities wishing to prevent delinquency: parental education, adequate family income, periodic medical examinations for all children and free treatment when necessary, adequate recreation facilities, flexible school curriculum and cooperating clinics, vocational guidance for all children with an adequate follow-up system, enlarged court facilities, better trained probation officers, and better contact between the court and child guidance clinics.

Summary

Behavior maladjustment in children is widespread, and varies from slight misbehavior to serious delinquency. Misbehavior in school usually begins with minor infractions of school regulations, such behavior being often overrated in importance by teachers, who are apparently more concerned with orderly school procedure than with pupil development. Behavior of this sort, however, is often the forerunner of a career of juvenile delinquency, and it appears possible in some cases to predict outcomes. The causes are probably both constitutional and environmental, but there is no evidence that delinquency as such is inherited. Much relationship is found between delinquency and environmental factors, although direct causes are seldom established. Behavior problem children are usually below average in mental development, the percent of mental deficiency among them being greater than in the general school population. Special mental conditions and emotional disturbances are of relatively high frequency, and are generally considered as having a causal relationship. The machinery for treatment includes special classes, special schools of the parental-school type, and institutions, usually maintained by the state, receiving cases through the juvenile courts. There are also private special schools, including those of the junior republic type. The placement of problem children in foster homes is used as an alternative to institution commitment. The juvenile court is extending its sphere of influence, especially through probation procedures. The child guidance clinics are helpful in individual cases, and have contributed much to the understanding of the problem child. These clinics reach relatively few cases, however, and their influence on the prevention of delinquency is as yet unmeasured. The newest development is the coordinating council, wherein various agencies in the community work together for prevention of delinquency.

CHAPTER VI

Physically and Mentally Exceptional Children

SINCE BEHAVIOR PROBLEMS AND DELINQUENCY were reviewed in the preceding chapter, this discussion of exceptional children is limited to those showing two general types of variations: (a) physical and sensory defects and (b) intellectual deviations, ranging from feeble-mindedness to genius as well as special talents and defects. There is no scarcity of experimental and research material at hand dealing with these types of cases. From over 3,000 studies and reports our selection is limited to scarcely over 100.

Physical and Sensory Handicaps

The effects of physical and sensory handicaps extend over a wider range than the loss of educational efficiency. They include social maladjustment with its feelings of inferiority and a struggle to overcome the deleterious effects of one-sided competition, which may extend into the classroom. Such frustrations carry the feeling of inferiority into a search for other avenues of compensation which cannot always be achieved. The types of emotional strains arising from such conflict and how they operate in various types of handicaps will be the general theme of this chapter.

General health and vitality—Good health and vitality usually tend to generate hopeful outlooks while poor health is conducive to less hopeful trends. Kanner and Lachman (537) showed that illness frequently develops unjustified apprehensions and undesirable parental attitudes which must be changed. Nilson (558) prepared an age-grade study of 1,500 physically disabled children in the Minnesota public schools and declared that this status was "fairly comparable" to that of regular pupils. A sense of comedy and jollity was powerful in the recovery and restoration of sick children in an institution according to Schmidt-Lamberg (571). Pfleger (563) described the frenzied tyranny exercised over four different girls by a girl with heavily disfiguring features, in an attempt to compensate for her unattractive appearance. Residual assets as well as defect liabilities, according to Crothers (502), must be discovered if children with sensory-motor defects are to be happily educated.

Visual defects—Defects of vision range from slight incapacity to total blindness. All degrees of vision impairment offer problems of adjustment, differing in nature according to the severity of the handicap. Hathaway (526) stated that there are 50,000 partially seeing children in need of special sight-saving education with only 10 percent of them getting such training. Many of these partially seeing children constitute a problem of mental hygiene according to Flanigan (517) who showed that the nervous tension attendant upon unusual eyestrains reflects itself in difficult behavior pat-

terns. The sight-saving teacher faces the double task of instructing in unusual ways accommodated to the visual defects and of restoring and maintaining a better mental and social balance of her pupils.

Various studies show that the unusual powers often attributed to the blind in the use of other sensations are contrary to fact. Koch and Ufkess (542) found that blind subjects tend to be less successful on the average in a stylus maze-learning test than seeing persons. Bechtold (481) discovered that the blind surpassed the seeing in the immediate retention of meaningless material, but were inferior in meaningful material. In the former case the concentration through the ear assisted the blind, but in the latter they lacked the ability to retain the image of the ideas. Persons who became blind after the first five years of life progressively deteriorate in the visual images in dreams as reported by Bolli (488). Dumas (513) found that the blind are incapable of mimicry of the emotions of delight, joy, anger, and fear, and he concluded that such traits are of visual and social origin.

Dry and Cooper (512) surveyed a school for the blind and found many of the inmates also feeble-minded, others pseudo-feeble-minded, stubborn, reluctant to assume responsibility, and extremely inattentive. Other studies of the feeble-minded blind were summarized by Burritt (498) and in two anonymous bibliographies (487, 574). Two blind individuals, Villey-Desmeserets (578) and Cutsforth (503), have written extensive treatises on the limitations and abilities of the blind.

Auditory defects—Combinations of visual and auditory defects were described extensively by Helen Keller (538) and Laura Bridgman (567). Goodenough (522) studied a blind-deaf child and concluded that the primary forms of expressive behavior are determined by native factors. The major problem of the deaf is the extreme social and psychological isolation which the defect produces, and to break down this seclusion is among the most difficult teaching processes. According to Haines (525), deafness is characterized by an isolation from much of reality, a childish curiosity to break down the wall of separation, becoming self-centered and often morose, mistaking other people's actions, distorted vocal expression, and often a feeling of inferiority. The deafened person may pretend he is not deaf.

Bieri (485) and Brauckmann (490) showed that the performance of the deaf rises rapidly with the acquisition of speech, although it never reaches that of the normal child. Brauckmann disclosed that speech of the deaf is acquired through exercise of the mechanism of the vocal and speech movements when they are ready to function which is the same principle in the learning of the hearing child.

In his mental survey of the deaf, Pintner (565) found that the deaf child from twelve to fifteen years of age achieves what the hearing child of eight or nine years does, with little difference between the oral and manual methods of instruction. Long (548) found that the deaf and hearing persons are not widely different in motor abilities with deaf boys superior to hearing boys and hearing girls superior to deaf girls. In a balance test Long found

the deaf significantly inferior. Mann (555), in an article on "The Seventh Sense," discussed the great importance of the vestibular sense in aviation, and outlined tests for prospective aviators along these lines.

Pintner (564) and Welles (580) used the Bernreuter Inventory on hard-of-hearing individuals living in small towns and compared them with hearing persons paired in age, education, and social background. The hard of hearing were found to be more neurotic, introverted, and submissive, with no relationship to age at loss of hearing. Those who were clearly maladjusted had a high neurotic score, but the readjustment of many cases was worthy of attention. Lyon (552) reported that 30 percent of deaf high-school boys and girls, tested on the Thurstone Personality Schedule, are either emotionally maladjusted or should have psychiatric advice, but raised doubt as to the suitability of the test to the group.

Orthopedic defects—In addition to the basic unsocial pattern, feelings of helplessness and inferiority, crippled children suffer disturbances of the sympathetic nervous system from distortion of the viscera and various vital organs. Von Baeyer (579) classified three mental distortions of the crippled: (a) the basic disease permanently or temporarily damages the biological substratum of mental life; (b) the condition of being a cripple threatens the free development of the mental capacities; and (c) the emotional tension caused by the experience of being a cripple may manifest itself in neurotic phenomena.

Studies of the intelligence of crippled children have given the impression that they are quite backward mentally, but in more recent years surveys of schools for the crippled, such as those in Detroit, show an encouraging improvement in the I. Q. levels to about 90 rather than ten to fifteen points lower. This result is thought to be due to a better understanding of the functions of these schools with the consequent enrolment of better classes of children mentally. Witty and Smith (584) reported an average I. Q. of 84.5 on 1,480 crippled children. Lee (546) reported the I. Q.'s of 148 patients in the Seattle Orthopedic Hospital appreciably below that of normal children. Winkler (583) found 100 crippled children only slightly retarded with greatest handicap in imaginative activity or in powers of observation.

Williamson and Christian (582) examined disabled students at the University of Minnesota as to mechanical, artistic, clerical ability, space relations, dexterity, etc., with necessary reorientation of some who had previously been given too much encouragement as to their possibilities, motivating those with poor morale, discovering mental disorders of which the students were often unaware. Since there are at least 10,000 crippled children in the United States and only one-tenth are receiving any special attention, Ingram (532) stresses the purpose, adaptations, and values of special orthopedic schools.

Cardiac disorders—There are many thousands of cases of cardiac impairment which do not present obvious external symptoms, although the

fatal effects operate in sudden and unexpected places. Bronk and Ferguson (494) conducted physiological investigations which showed that the vagal branches going to the heart carry a large number of sympathetic fibers which conduct impulses concerned with cardiac acceleration. That the heart is very persistent in its reactions was shown in experiments on cats by Britton, Hinson, and Hall (493). They proved that after one and a half minutes of excitement the heart rate is approximately 50 percent over that of the normal, and that animals who were subjected to emotional stimulation every second day over a period of eight weeks showed no diminution on cardiac response. Lombard and Cope (547) discovered that the systolic phase of the heart is longer and the heart rate faster in women than in men. Fulstow (520) found that the weight of the hearts of schizophrenics underwent the same changes as in normals, but with a weight somewhat less than for normals.

Children and adults may use their physical cardiac handicap as an excuse for abandoning any competitive behavior according to Foster (518). Thus they uncover features of their personality which had otherwise been concealed and dormant. Emotional states may produce physiological states which are interpreted as cardiac abnormalities. Sigel (572) also found restriction of activities with a very high correlation between the presence of cardiac difficulty and mental hygiene problems. The majority of cardiac patients do not complain of subjective symptoms, whereas those who do complain usually have emotional problems.

Epileptic disorders—Eyrich (514) distinguished three typical syndromes of epilepsy: (a) slowing of all psychic functions with loss of spontaneous activity; (b) explosive irritability with egocentric oversensitiveness to slights of interests and vanity; and (c) hyperkinesis with elemental compulsive restlessness, increased suggestibility, and poverty of feeling. Bartemeier (480) emphasized the study of actual social situations in which convulsions took place, organization of the family constellation, and sometimes removal to a different environment. Epileptoid reactions in children are classified by Branham (489) into two groups: (a) the latent type of epilepsy with attacks usually at night with the following day characterized by pallor, confusion, and dullness; and (b) the *petit mal* type with headache, nausea, dizziness, flashes of color, unusual pallor, and dilation of the pupils without apparent cause. His stress on mental retardation was confirmed by Patterson and Fonner (562), Bridge (492), and R. R. Brown (497). Grossmann (523) interpreted their frequent criminal trends as an attempt to conquer death in themselves which always seems imminent, and annihilation is paid back with annihilation. In religiosity they hope for liberation from the fear of death.

Dr. O. P. Kimball has recently done experimental work in Cleveland and Detroit with medication for epileptics which attempts to control changes in the chemical composition of the brain of epileptics. He modestly claims reduction in seizures in more than one-half of the children under his care.

In Detroit a first public school for epileptic children has been established, with the theoretical increase of seizures due to exposure and suggestion failing to materialize.

Endocrine phenomena—The ductless glands or the endocrines have been investigated with regard to disturbances in physical growth, mental development, and disturbances of character, personality, and behavior. "Toledo's strong boy" had a sexual and anatomical development of an adolescent when only four or five years of age, resulting from a suspected tumor of the pineal gland according to McClure and Goldberg (553). Fassbender (515) reported on a similar condition in a seven-year-old girl with premature development of genitalia. Rockwell (568) reviewed over 200 publications on effects of the thyroid gland with voluminous evidence of disturbances of physical growth associated with malfunctioning of the thyroid. Joll's monumental volume (535) dealt exhaustively with diseases and disturbances resulting from the thyroid gland. Studies by Fox (519) and by Kimball and Marinus (539) disproved popular beliefs that sensational changes in intelligence result from glandular therapy. They found among the feeble-minded that treatment tends to check the fall of intelligence quotient and to lend greater stability to general nervous control. Hayward and Woods (527) pointed out the misleading impressions of mental deficiency resulting from hypothyroidism. Lurie (551) reported that of 500 children studied at the Psychopathic Institute of the Jewish Hospital at Cincinnati, fully 10 percent had marked endocrine disorders and 60 percent had some types of internal disorder. In a similar study Rowe (569) found about one-third of behavior cases definitely linked with glandular disturbance. Berman (482) concluded that endocrine disturbances were from two to three times as frequent among criminals as among control groups. All of these studies and many others suggest the great importance of more intensive and general study of the endocrine among backward and maladjusted children.

Manual and motor development—Motor skill and manual dexterity vary among individuals and with reflections in emotional strains and social adjustments. Langdon (545) showed that while there is a central or common factor to manual dexterity among the various activities of any individual there are also specific skills, and the excellence in one phase is not a sure guarantee of similar trends in others. Landauer (544) emphasized the role of motor forces in behavior, with grace and rhythm in the infantile stage, a latent period of awkwardness, followed by adult habits evolving from puberty. These adult motor reactions resolve into a personal tempo for each individual, according to Braun (491), which are not susceptible to any extreme change. Hicks (528) reached a similar conclusion in studying the acquisition of motor skill among young children which seemed to be derived from structural maturation and general practice rather than from specific practice.

Handedness—The determination of preferential handedness in children from two to six years of age was developed by Updegraff (577) on con-

trolled observations and by tests. Preference was usually found throughout all activities, and in 36 out of 40 cases tests and observations agreed. A study of 25 unchanged left-handed and 43 changed left-handed children in handwriting only by Haefner (524), comparing them with 68 pure right-handed children matched as to chronological age, sex, and school grade, showed no significant differences in intelligence, school achievement, height, general interest, or worries. Pyle and Drouin (566) examined the 7 percent of children in three Detroit elementary schools who wrote left-handed, but found a slightly lower level of intelligence and school achievement which they believed to be due to handicaps arising from an environment designed for right-handed subjects. Many cases of letter reversals, inaccuracies, and confusions leading to special disabilities were attributed to handedness by Dearborn (505). Downey (510) noted relapses to the preferred handedness in novel tasks, in curious experiences involving vision, in orientation, and in changes in organic tension. Dominance of function is known to concern eyes and feet as well as hands. The relations of these dominances to each other in individuals is a matter of conflicting evidence.

Nervous and encephalitic children—Since in the preceding chapter on behavior problems and delinquency, physical and nervous causes were considered, only incidental mention will be made here. Chadwick (499) classified children's neuroses under four heads: (a) infantile impulses seeking gratification in conflict with repressions; (b) the child in conflict with infantile impulses; (c) the child's ego in alliance with infantile impulses in open conflict with parents, society, and environment; and (d) the child in conflict with reality.

The cases of post-encephalitis offer some extremely baffling problems related to nervousness. Often the parents and the school are not aware of the presence of this disease and attribute behavior and mental manifestations to deliberate intention of maladjustment. Dawson and Conn (504) presented definite statistical evidence of mental deterioration with cases of encephalitic lethargica. Berrien (484) discussed the similarity of encephalitic and psychopathic children in temper tantrums, uncontrolled emotional outbursts, lying, truancy, petty thieving, lack of foresight, impulsiveness, and sex offenses, but with a dissimilarity that the encephalitic children rate uniformly below their chronological age on all mental tests. The same author (483) found that *only* encephalitic children tend to reverse sex characteristics in drawing the human figure.

Gibbs (521) found that emotional disturbances were the most constant clinical factor in encephalitic cases. Hill (529) noted that following encephalitis there is a loss of inhibition over the primary emotions, with impulsiveness, restlessness, lack of self-control, lack of concentration, disobedience, and defiance. While the number of cases is quite limited, their severe maladjustments constitute a serious school problem.

Speech disorders—Many investigators have noted the close relationship between the changing of handedness and speech disorders, although the

exact nature of this phenomenon has never been established. Oates (559) observed that while sinistrality is not correlated with either superiority or inferiority of intellect, marked departure from unilateral functioning is definitely related to complications in the nervous organization. Kistler (541) discovered that individuals who remain left-handed are generally retarded in motor development and that this same delay in motor development brings about functional disturbances in speech.

Low intelligence is a symptom rather than a cause of speech defects, according to Barnard (479), who also declared that personality traits are more enlightening than intelligence in the study of speech defects, since they point to emotional difficulties as the source of stuttering and kindred speech defects. Smirnova (573) explained that speech, being the most subtle of movements, is the most delicate of them, and hence disorders of speech often arise from general maladjustments. Stutterers are featured by shyness, anxiety, depression, and nervous instability with increasing burden in the face of increasing age and greater social and vocational responsibilities, according to the experiences and observation of W. Johnson (534). Dorsey (509) emphasized that stutterers should be made to act more and think less since this is a disorder of the person, and F. W. Brown (496) suggested personality integration as the essential factor in curing stuttering permanently.

Intellectual Deviations

In this group are children ranging from the lowest level of institutional feeble-mindedness to mental genius. While mental ability has long been recognized as an important factor in success or failure in school, in this report consideration will also be given to effects on personality and social adjustment arising from intelligence and its influence upon school success.

Institutional feeble-mindedness—Many of these cases enter the public schools and sometimes they are allowed to remain unrecognized except as backward children, deriving a minimum of benefit and often causing unnecessary worry and concern to teachers. A common subtype of this group are Mongolian idiots who bear some resemblance to Oriental races with slanting eyes, dark coarse hair, and highly flushed cheeks. They are generally recognized as arising from some debility or unusual condition of the mother during pregnancy. Ordahl (560) found that they are usually among the later-born of families, while Kuenzel (543) gave additional notations on tongues long, thick, and broad often protruding from the mouth, with thick lips, hands dry and chapped, and a shambling gait. They are pleasant and agreeable in contrast to opposite trends in many other low-grade feeble-minded.

Mental growth studies of the feeble-minded by Chipman (501), Moore (556), and Woodall (586), showed a tendency for a slight fall in I. Q. upon repeated tests, Chipman noting that in 79 percent of his cases there was no significant change. Doll (507) estimated that fully 10 percent of the

feeble-minded are characterized by birth injury, which is also attended by handicaps of speech and movement. These, however, tend to lessen later in life. Lowrey (550) is one of several who reported universally that contrary to popular opinion the feeble-minded do not constitute the criminal and delinquent class since they are usually guarded and protected either in or outside of institutions. DeBeer (506) noted a decreased degree of concentration of attention, lack of foresight, and enhanced suggestibility as characteristics of the feeble-minded. In contrast to the American system, the feeble-minded in Belgium are cared for in homes rather than institutions, which affords a possibility of better social adjustment, as reported by Doll (508).

Borderline and subnormal cases—A common practice is to provide special class training in public schools for cases ranging in I. Q. from 50 to 75, but to dispatch the socially unstable of this group to institutions. E. H. Johnson (533), Ide (531), and Kinder and Rutherford (540) emphasized that social adjustment is the critical factor of success or failure within the special class type of children. Kinder and Rutherford found only 14 out of 68 in a five-year follow-up study who were adjusting satisfactorily, and that these 14 were from good social environments, whereas the remainder were universally from undesirable situations. Lord (549) investigated over 400 cases in Massachusetts special classes with a surprisingly large number making satisfactory adjustments, and three-fourths of the homes being also effective. The most extensive follow-up study was conducted by the United States Children's Bureau (500), in which approximately 2,000 cases were followed over a five-year period in several large cities. Approximately 80 percent of the group of 400 cases from the Detroit group of this study were gainfully employed at the time of the investigation. From these studies it may be concluded that the mentally subnormal may succeed when socially stable, and that a mild amount of supervision and placement aid yield surprisingly good returns.

The intellectually inferior and superior—These two groups represent distinct and separate classes of children each with approximately one-fourth of the school population slightly below and above the average, respectively. The inferior group presents some characteristics allied to the mentally subnormal, and the superior, allied to the gifted which is considered next. The most comprehensive discussion of these groups was presented, with Coxe as chairman, by a committee of the National Society for the Study of Education (557) in which the characteristics, the social implications, and problems of instruction and curriculum adaptations were described. McElwee (554) used a checklist of fourteen characteristics, such as school work, good effort, quietness, obedience, and stubbornness, on inferior and superior groups, and while there was an encouraging presence of desirable traits in all levels they were much more predominant in the superior. Baker (477) summarized the opinions of 500 Detroit elementary teachers on differences between these groups. Differences were noted in social and

mental traits more marked than in those of educational achievement, chiefly in the dull being unsocial, selfish, self-centered, lacking in initiative, and honeycombed with all manner of educational disabilities, while the superior were characterized positively in all of these respects. Cohen and Coryell (476) recently prepared a new study on educating superior students at the high-school level, reporting investigations in New York City schools.

The intellectually gifted—The most exhaustive studies of genius have been produced under the direction of Terman (575). The reports, particularly in volume one, show overwhelmingly that the gifted are superior in all types of social and personality traits as well as in intelligence. Finch and Carroll (516) found significant superiority as high-school leaders in 66 gifted matched against an equal number of superior and of average pupils. Jones (536) reported physiological condition and home environment superior in 120 superior children. Great versatility of interests was shown in 300 eminent men reported in the Stanford studies as investigated by White (581), with scientific and literary interests being the most predominant and scholastic and administrative less predominant. Terman (576) reported that satisfactory progress has been made in 40 cities in which special classes for the gifted have been established.

Witty and Lehman (585) characterized the genius as a highly delicate mechanism which is prone to develop nervous instability whenever problems of adjustment arise. They designated him as unstable, often neurotic, and almost invariably eccentric. Hollingworth (530) discussed a gifted girl with respect to lack of conformity in social adjustment. Since the gifted represent a small but very important element of the population, education needs to give more care to problems of their education.

Special talents and defects—This topic has always been marked by spectacular interest, and its results and frequencies grossly overestimated. The cases are probably less marked than supposed, but memory of the rare case of feeble-mindedness with the special ability approaching the average, or the disability of the infrequent gifted serves as an excuse for making less effort to provide for the great majority who run true to form. Baker (478) investigated 900 children nine years of age and discovered approximately 7 percent who offered problems of educational disability. These cases were also suffering from personality and social maladjustments in 53 of 60 cases, which were probably generated in part from failure in one school subject. A. W. Brown (495) studied the unevenness of the abilities of dull and bright children on the Stenquist Mechanical Tests, and Mechanical Assembly, Haggerty Intelligence Examination, Delta 2, and Pintner Non-Language Mental Test and concluded that dull and bright show nearly equal unevenness. Billings (486) reported on a case of inverted writing and drawing but with marked improvement upon special coaching. Cases of specific reading disability were described by Orton (561) who has given special attention to reversals which he ascribes to lack of dominance in cerebral hemispheres. Instruction including directional kinesthetic training

is effective in remedial teaching. Mathematical prodigies were described by Sándor (570) who found Finkelstein superior to Diamandi and Inaudi, but inferior to Ruckle. Requisites for such performances are power of concentration, rapid orientation among figures, interest in and a sentiment for mathematical combinations, knowledge of number theory, sensing of abstract relations discovered empirically, a ready-made stock of partial sums, and auxiliary images. These unusual cases serve as a fine laboratory for educational research.

Summary

There is a wide variety and diversity of types of physically and mentally handicapped children who offer challenges to education. Most of these cases afford problems of psychological and educational disability. They also tend to show evidence of emotional and social deviations which further complicate their educational and vocational success. In order to be successful the schools must make special provisions, and also be able and willing to cooperate with the social, medical, and all other agencies in the community. The education of handicapped children opens avenues for a wider conception of all educational programs.

CHAPTER VII

Technics and Instruments of Mental Hygiene

MENTAL HYGIENE CONCEPTS are synthetic in character and rest on a vast body of case materials and quantitative researches which come through special organizations of knowledge from such fields as psychoanalysis, psychiatry, psychology, sociology, religion, eugenics, and education. The task of the present chapter is primarily to survey the systematic formulations, the technics employed in diagnosis and treatment, illustrative case procedures, and the appraisals of the effects of treatment. To bring the material into the confines of the space allotted and to meet the interests of the majority of readers of the *Review of Educational Research*, preference has been given to systematic treatments, articles with a research orientation, environmental and mental therapies, and work with children. Mental hospital, adult, neurological, and operative studies have been excluded for the most part.

SYSTEMATIC FORMULATIONS

Psychoanalysis

The technics and principles of psychoanalysis have been largely derived from work with adult patients. Adult analyses, however, immediately assign a major role to the patient's childhood experiences. The extensive and early work of Freud, Jung, and Adler is too familiar to require special citations. A résumé of the history and principles of psychoanalysis may be found in books by Healy and others (633) and Hendrick (637). The ramifications of psychoanalytic concepts in many fields were presented in a series of essays edited by Lorand (665).

In recent years direct analytic work with children has become more extensive. The January, 1935, number of the *Psychoanalytic Quarterly* was devoted exclusively to child analysis.

Interested readers may well consult the work of Anna Freud (617, 618, 619), daughter of Sigmund Freud, for orientation. Her emphasis is that every hysteria or compulsion neurosis can be traced to early childhood. Klein (653) has given an exposition of methods used in child analysis. She stressed the role of early anxiety situations in the development of the child. The facts in her presentation are made to bear an elaborate speculative superstructure.

Psychoanalysis has supplied or organized a large technical vocabulary pertaining to the facts and principles of mental life—normal and abnormal. The importance for mental hygiene of concepts such as are illustrated in the following terms is obvious: unconscious, repression, rationalization, conversion symptoms, abreactions, catharsis, free association, displacement,

identification, transference, projection, complex, pleasure principle, repetition compulsion, libido, ego, id, superego, narcissism, identification, anxiety, inhibition, symbolism, resistance, and interpretation.

Child Psychiatry

Kanner's book (650) was written primarily for pediatricians and has a psychobiological emphasis. A brief section on general principles is followed by a discussion of examination, diagnosis, and case records. Separate chapters are devoted to complaints, age, physical health, intelligence, emotion, sex, constitutional and environmental factors. Treatment is discussed in relation to work with the child, family, and community. Four chapters are devoted to personality difficulties directly traceable to pathological alterations of nervous tissue. Eight chapters are devoted to disorders of functioning which cannot be traced to organic lesions. Tics, disturbances in digestion, respiration, perception, etc., are placed in this category. The last thirteen chapters are devoted to problems involving the personality as a whole. Richards' account (692) was based on the clinical work in Johns Hopkins Hospital. The rationale of psychotherapy with children was well stated by Potter (684).

Child Development

Research in child development has been a particularly productive source of accurate descriptions of the physical, mental, emotional, and social growth of normal children and of experimental studies of the conditions under which behavior may be modified. Investigations have been reported in the February, 1936, *Review of Educational Research* (703) devoted to mental and physical development and in other special issues devoted to learning and the use of tests. Texts in child psychology give special attention to social and personal problems such as those by Curti (609), Goodenough (625), Jersild (642), B. J. Johnson (645), and Stoddard and Wellman (702). Russian pedology has placed similar emphasis upon integrated research (688).

Sociology

Reckless and Smith (691) surveyed the field of juvenile delinquency and summarized some of the outstanding problems and methods of work. The book reports statistical analyses, discussions of physical and mental traits, social background, juvenile courts, and institutional care. Some chapters are also devoted to school maladjustment and readjustment by clinics and placement bureaus. Chapters are devoted to preventive programs and the results of treatment. Glueck and Glueck (623) edited a symposium on crime prevention programs grouped under the large divisions of community, school policy, intramural and extramural guidance, and boys clubs and recreation.

Mental Hygiene

A number of books have been written which relate the principles of mental hygiene directly to education, the community, and the family. Earlier works by Blanton and Blanton (594), Burnham (601), Groves and Blanchard (628), Kirkpatrick (652), Morgan (673), Sherman (701), Symonds (707), and Zachry (725) can be noted only by name. The point of view of psychiatric social work is represented by Bassett (591) and by Lee and others (658). Books first published in 1935 and 1936 are given special mention here. The chief contribution of Wallin (714) lies in the extensive retrospective reports dealing with early difficulties of adjustment on the part of normal persons. Even granting the reservations one must maintain with respect to accounts of this type, the vast number of problems of mental hygiene significance occurring in the family and in home and school situations can hardly be questioned. Mechanisms and modes of adjustment are discussed in connection with the case material. The book by Howard and Patry (639) is concerned with the detection and prevention of unwholesome mental patterns, the hygiene of emotion, child training, and family relationships. The teacher audience has been kept in mind by Rivlin (693) in a book which gives a brief overview of the contributions of various schools of psychology to problems of behavior and to the mental hygiene of the classroom. Shaffer (697) illustrated the possibility of a conception of adjustment which can be stated in objective terms. He avoided the use of psychoanalysis and pointed out the equal acceptability of principles and procedures which are the outgrowth of objective psychology.

Critiques

Mental hygiene concepts have been attacked and defended vigorously from both the scientific and professional points of view. The discussions by research workers have been more concerned with the nature of evidence which is acceptable to support theoretical formulations and with the need for the verification of claims made by exponents of particular schools. On the other hand, professional discussions have been centered upon the unique contributions and competence of workers concerned with children from such fields as education, neurology, psychiatry, psychology, pediatrics, sociology, religion, speech, and general medicine. In practice, clinical organizations usually recognize the desirability of a multidiscipline approach. Increased research and the growth of eclecticism are evidences of the coming of age of a science of human relations.

DIAGNOSIS AND TREATMENT

Diagnosis in the sense of classification has a relatively small place in the mental hygiene literature, most of the attention being devoted to securing types of evidence significant for a solution of a particular problem. Frequently diagnostic procedures are an intrinsic part of a continuing plan which also involves treatment. Systematic discussions of problems in diag-

nosis and treatment were prepared by Symonds (706) and Olson (677). The comparison of delinquents and their siblings offers a new technic for the determination of etiologic factors (631).

The Interview

The interview continues to be the basic method for securing data to determine causative factors, diagnosis, and treatment. The most comprehensive systematic account of the interview is that of Bingham and Moore (593). They described an interview as a conversation with a purpose. Unreliability may be due to the interviewer, the interviewee, or their relationship. It was suggested that an interviewer utilize some interest of the interviewee as the point of departure. A large number of recommendations were given concerned with the establishment of rapport and the method of securing data. The employment, social case, educational, mental clinic, and journalistic interview were described. Problems of testimony involved in court examination and cross examination were discussed and research studies quoted. A bibliography of 338 titles is a useful adjunct.

Young (724) treated briefly of general interview methods but dwelt particularly upon the types involved in diagnosis and treatment in social case work. The diagnostic interview is usually intended to define the situation and the problem, and the subject's motives, attitudes, and aspirations. The value of collective interviewing, as for example that with the family of a delinquent in bringing out conflicts and relationships, was noted.

In the chapter on the technic of the interview she stressed the value of a period of preparatory thinking, but at the same time advised leaving the situation flexible for new developments. Approach, rapport, and physical setting were discussed. The interviewee should know the relationship of the interviewer to the situation. Such details as manner of greeting, facial expression, and personal appearance were regarded as important. The establishment of common purposes, the observance of convention, and "face-saving" are as essential in the interview as in social life in general. Other problems discussed were concerned with dishonesty, the closing of the interview, and the test of its success.

The ethics of the interview situation were considered, and numerous outlines were presented indicating their factual content for various purposes. The conscious use of technics on the part of the interviewer was well described and the interactive process was analyzed. The last three chapters of the book are specifically devoted to a discussion of the dynamics of social therapy. Sympathetic insight, identification, mental catharsis, definition of the problem, the conditioning and reconditioning of attitudes, the suppling of motivation, mutual planning, and satisfaction of wishes are paragraph headings which indicate content. Both mental and social therapy are involved. A bibliography of 242 titles adds to the value of the work.

Promising beginnings on the objective study of the interview were made by Lasswell (657). Specific practical suggestions were made by Allen

(588), Burlingham (600), Moore (672), Sheehan-Dare (700), Symmes (705), and Whitley (719).

Free Association

Free association, especially stressed in psychoanalysis, constitutes an important method of securing data concerning a particular condition which is disturbing the child or adult patient. There is an extensive psychological literature on free association in which a stimulus word is given and the response analyzed either for its logical or emotional relationship. The common analytic practice would be to establish rapport with the patient and then ask him to report freely whatever thoughts came to his mind. The analyst may at times sense the significance of a specific portion of the material and ask for further associations. In this manner emotionally linked material is gradually brought to the fore. Such an association may never have been fully comprehended by the patient or may have been largely forgotten. Patients frequently report dreams in their free associations. The process in itself may be regarded as therapeutic (passive therapy), or the analyst may interpret the material (active therapy) so as to give the patient insight into the problem. Both systematic work and clinical accounts mentioned elsewhere in this chapter give special attention to association methods. Many workers feel that there are limitations in the direct use of these methods with children and they may implement the situation so as to secure associations with toys, child products, or in imaginative play. These methods are reviewed in later parts of the chapter.

Diagnostic Aids

Family and personal history—Most of the systematic accounts mentioned in earlier sections of this chapter contain outlines designed to secure data of importance for treatment. Clinics usually have prepared forms or suggestions. A form usually contains routine identifying data concerning the child, hereditary factors, special abilities and disabilities, educational and health history and status, and some account of the personalities and relationships in the family. The "complaint" with a redefinition of the problem and predisposing and precipitating factors usually finds a place.

Observations of "natural" behavior—The superior validity and reliability of observations made and recorded at the time the specific behavior occurs in its natural setting is coming to be recognized. The value of cumulative records of incidents in behavior journals has been noted by Blatz and Bott (596), Charters (606), Lämmermann (656), Moldovan (671), Olson (676), Randall (690), Winkler (721), Wood (723), and others (686). Such observations may be employed as part of a routine or may be used as a basis for the study of particular children. Methods of using direct observation for measurement purposes were reviewed by Olson and Cunningham (680).

Questionnaires, rating scales, and tests—Summaries of measurement technics of significance for research and programs in mental hygiene were prepared by Horsch and Davis (638), Maller (668), Olson (678), G. Watson (716), and Symonds (708). Three extensive recent researches should receive special mention. Baker and Traphagen (590) devised a method of scoring 66 diagnostic items having to do with a variety of environmental, historical, and present status material about children. The items and total score were related to the diagnosis of delinquency. A ten-year investigation of sex differences in interests, attitudes, and thought trends was recently reported by Terman and Cox (710). The masculinity-femininity scores were given a quantitative analysis and related to clinical material. Doll (612) elaborated the concept of growth in independence in a social maturity scale now available with a manual of directions and preliminary norms.

Autobiography, biography, composition, diary, poetry—The value of the autobiography as a technic in case work has been best discussed by Selling (696). From some persons a written autobiography is more readily obtainable than the same facts through direct examination. Kamaryt (649) secured some of the earliest memories of seventh-grade pupils. He discovered that many of the recollections thus obtained were accompanied by a strong emotional tone, both pleasant and unpleasant. The amount of recall of the unpleasant tends to question Freudian theories of repression. Dudycha and Dudycha (614) had college students report their preschool experiences and again found such emotional coloring of fear and joy. Bühler (599) indicated the research possibilities of diaries by the analysis of 93 diaries written by boys and girls born between 1830 and 1915. Tramer (713) published the diary of a psychotic child. Analyses based upon samples of poetry composed by the subject have received but slight attention (674). Popovic (683) suggested that the writing of self reports has therapeutic value. He observed two groups of adolescents for several years, one which had practice in writing self reports and the other which had little or no practice. The reports were written as school exercises in composition and dealt with the pupils' intimate lives. The claim is that practiced pupils control their instinctive and emotional life better than the unpracticed. The problem should be subjected to quantitative study.

Dreams—The important role ascribed to dreams in early Freudian literature has continued to find a place in recent studies. Most readers will be content with the summary prepared by Kimmins (651) in *The Handbook of Child Psychology*. He pointed out that healthy children enjoy dreams and the telling or recording of them. He classified dreams as wish fulfilment and fear dreams; kinesthetic dreams; references to fairy stories; compensation dreams; dreams of bravery and adventure, school activities, motion pictures, exciting books, and death incidents; and dreams with conversation, and the presence of other witnesses than the dreamer. The compensatory function of the dream is shown in children in certain types

of schools. Fear dreams are common among the deaf and the blind. A child blind before the age of five never sees in dreams. There has been some success with dream control, but no definite conclusions have so far been reached. The dreams of problem children have been related to the defensive character of their acts by Seidler (695). Willoughby (720) analyzed a simple dream to reveal and realign the motives involved. An extensive analysis of children's dreams was prepared by Jersild and others (644). Cason's study (604) of the nightmare dream includes an extensive bibliography on mechanisms and treatment.

Play and child products—As was previously stated, toys and manipulative materials have been used extensively to implement the interview situation, both for diagnostic and treatment purposes. For example, D. M. Levy (661) used dolls representing the mother, the baby, and a younger sister or brother to bring out the child's reactions of jealousy and sibling rivalry. Liss (664) used puppets and drawings. Ramos (689) and Fries (620) used toys. Lowenfeld (666) utilized free play in a pleasant room as a means of treating psychoneuroses in childhood. Clark (607) took the point of view that we can begin to recognize tendencies in infancy and childhood which may lead to later mental disorders. In the use of play technics, the child may dramatize his conflicts and reveal mechanisms. The materials produced in drawing, poster painting, finger painting, and plastic work have served as a basis for data collection and interpretation among various investigators (663, 699).

Treatment Procedures

A widely used formula in the mental hygiene approach to problems of behavior is to modify the child, the environment, or both in order to secure adjustment. The distinction between procedures is usually one of emphasis, since there is constant interaction between the child and his environment. General problems of treatment are surveyed in opening sections of the present chapter, and it has been noted that when personal relationships are involved in data collection and diagnosis, treatment may also be in progress. The nature of some of the more specific attempts at environmental or child adjustments will be noted in the following pages. Methods of treatment which involve adding or subtracting stimuli from the child's environment are considered to be environmental adjustments. Such adjustments would include measures aimed at the modification of the parents, home, school, or by transfer to a special institution.

Parent education, family relationships, and the home—The frequency with which the problems of children can be directly related to some undesirable situation in the home has often led to the conclusion that the parent rather than the child should be the focus of a treatment program. A study of means has resulted in an enormous amount of literature on parent education from many points of view. Special literature on research and problems may be secured from the National Council of Parent Education, the National Congress of Parents and Teachers, the Child Study Association of America, or from any of the child research centers. The literature of social work is

replete with studies of methods of handling economic and physical factors and problems of family relationships. The importance of the parent-child relationship and of the desirability of leading the parents to an understanding of their problems was brought out in the discussion of social treatment prepared by Heath (634). When the home cannot be made suitable for the child, foster home placement is a frequent method of adjustment (632).

Educational adjustment—Conflicts between the adjustment ability of the child and the requirements of the school situation have received considerable attention in the literature of mental hygiene. One possible solution suggests a preliminary study of the child to place him at that point in the educational organization which offers the greatest assurance of his success. This method is represented in the report of Noetzel and Hildreth (675). A more definite attempt to modify schools to the nature of children is also apparent in progressive practices everywhere. Avoidance of pressure, competitive comparisons, and discouragement was advocated by Plank-Spira (682) in connection with the adjustment of children having emotional problems. The manipulation of physical features of the environment is receiving attention (646). The effect of special school provisions on the conduct of problem children was described by Stullken (704) in connection with the Montefiore School. A number of private schools have been organized so as to take the child from the complex life of the large city to the simplified environment of country life in a supervised setting.

Institutional treatment—When a child is continually getting into trouble in his natural environment, a frequent recourse has been to place him under supervision in a correctional institution with a simplified environment. The institutional literature is omitted here. The amount of recidivism among graduates of schools of this type has led to considerable pessimism concerning their efficacy. Institutions that have held the correctional and educational function as paramount to that of punishment have done better than others. Institutional placement often appears to be the last resort when family and local community resources fail. Mental hospitals are making more adequate provisions for the care of children. Fenton and others (615) recently prepared an account of the delinquent boy and the correctional school.

Child management, training, and instruction—A series of books describing the technics for situational analysis and physical and verbal control of children was prepared by Waring and Wilker (715). Environmental and child management constitute the content of books by Blatz and Bott (595) and Thom (711). Palmborg (681) has written a popular discourse on methods of work with problem children. Suggestions for the classroom teacher were given in accounts by Pullias (687) and Campbell (602). Combinations of medical and educational services, as in the Austrian "Heilpädagogik," are of interest in this connection (670). Literature on the conditioning of children's emotions was reviewed by Jones (648). Specific suggestions for a combined manual and verbal technic for the elimination of thumb sucking were described by Hazzard (630). Studies

of the oral insufficiency theory by D. M. Levy (659, 660) are highly suggestive. The relationship between mental hygiene and the habit formations of children was discussed by Held (635). Investigations of tics by Blatz and Ringland (597) and of fears by Jersild and Holmes (643) contained suggestions which are useful in treatment. Language that is directive, unhurried, and approving showed superior efficiency in behavior control in the studies by M. W. Johnson (647). Character education methods concerned with attitudes, problems of group living, and the requirements of citizenship commonly aim at the influence of behavior by direct and indirect instructional technics. Character education may be defined so as to be all-inclusive of mental hygiene or it may be restricted in definition so as to constitute one of the special types of treatment employed. Previous issues of the *Review of Educational Research* are concerned with the research in this area. The relation of special disabilities in school subjects and remedial teaching to mental hygiene has received consideration in other numbers of the *Review* devoted to the psychology of the school subjects. Bradley and Bosquet (598) recommended books for their psychotherapeutic value.

Physical treatment—There are very few disorders commonly deemed non-mental which fail to present mental or behavioral symptoms. In some instances it is not clear whether the physical or mental factor is antecedent. Fritz (621) reviewed 669 references related to the general field of psychodietetics. Studies are surveyed on the relation of nutrition and behavior in such problems as nervousness, anemia, allergy, epilepsy, and hypertension. Investigations by Laird, Levitan, and Wilson (655) and Goodenough (624) are suggestive for behavior control. Addition of glucose to the diet has been reported as partially successful for the treatment of night terrors, car sickness, vomiting, insomnia, sleep walking, and nocturnal enuresis. This work is described in scattered clinical literature and in the systematic text of Henderson and Gillespie (636). The mental hygiene effect of hydrotherapy, diathermy, etc., are discussed from time to time in the *Physiotherapy Review*. The old prescription of rest and relaxation has come in for renewed attention through the researches of Jacobson (640) on progressive relaxation.

Occupational therapy—Occupational therapy has an extended range of treatment possibilities in both institutional and individual work. For practices in the field, readers should consult the *Journal of Occupational Therapy and Rehabilitation*. In this journal J. B. Gordon (627) described presentday methods of treating the mentally sick through occupational therapy which diverts attention and prevents further introversion. In the same journal Cooper (608) described the possibilities of occupational therapy in a child guidance clinic. The Pittsburgh Child Guidance Center used a workshop as an aid (654). The situation is used as a basis for observation, the development of rapport, and treatment. The therapeutic value of labor was emphasized by Chalisov (605). Values of recreational therapy were noted by Davis (611). Systematic treatments stress the importance of a satisfying occupation as a factor in therapy. (See also section on play.)

ILLUSTRATIVE CASE STUDIES

The field of mental hygiene places much dependence upon case material for data and for the development of both explanatory concepts and treatment procedures. *Child Guidance Cases*, edited by Sayles (694) and released for limited circulation among professional workers by the Commonwealth Fund, offers excellent examples of coordinated study and treatment. These cases were presented in detail with the data of the social history, physical examination, psychological examination, psychiatric examination, and the initial interviews with mother or child. Detailed notes were given on treatment conferences among the workers concerned, treatment plans, and summaries of progress. The above book was preceded by more abbreviated and popular accounts of typical children in home and school situations published under the same auspices.

The mental as contrasted to the social approach to criminality receives added support from the report of psychoanalysis of adult prisoners by Alexander and Healy (587). The child's own story was used with unusual success in the various accounts of the delinquency problem by C. R. Shaw (698). With the use of representative cases, Dollard (613) analyzed criteria for the life history.

Through the use of two extended records of work with children, Taft (709) defined a concept of "relationship therapy." Primarily aimed at individual treatment, the relationship is emotional and social rather than intellectual and technical. Her discussion perhaps differs from many of those concerned with mental therapy in a greater unwillingness to speculate on the forces and factors involved in treatment where one person takes a friendly interest in another. M. E. Watson (717) utilized a series of cases to illustrate history taking, interpretation, and technics of treatment.

Practically all of the general texts mentioned in preceding pages contain illustrative cases as do many of the non-quantitative articles concerned with diagnostic and therapeutic methods. It has appeared to be impractical to include many references to the voluminous literature of case studies. Such material may be examined by consulting practically any issue of such journals as the following:

American Journal of Orthopsychiatry
American Journal of Psychiatry
International Journal of Individual Psychology
International Journal of Psychoanalysis
Internationale Zeitschrift für Individual-psychologie
Internationale Zeitschrift für Psychoanalyse
Journal of Abnormal and Social Psychology
Journal of Juvenile Research
Mental Hygiene
Psychoanalytic Review
Psychiatric Quarterly
Psychological Clinic
Zeitschrift für Kinder Psychiatrie
Zeitschrift für psychoanalytische Pädagogik

A more extensive list of publications of significance to mental hygiene has been prepared by Jenkins (641).

APPRAISAL OF THE EFFECTS OF TREATMENT

It is reassuring that as mental hygiene has established a field and method of work, a literature on appraisal of outcome has gradually grown to meet the many inquiries concerning the effectiveness of treatment work in the areas of social and emotional maladjustment.

Practically unique in its use of both experimental and quantitative methods in this field is a study by Martens and Russ (669). Using a modification of the Haggerty-Olson-Wickman technic, they secured a quantitative appraisal of behavior before and after child guidance clinic treatment extending over a period of two years. A control group assisted in the interpretation of the findings. Granting the difficulties involved in the measurement of change by these technics, it is of interest to note that while the treated group did not show much absolute improvement on the scale, the non-treated group showed marked deterioration.

The most common procedure in appraisal study is to follow up cases after the lapse of a period of years and secure some judgment on their adjustmental status. Even such an appraisal must be conceded to be a large improvement over no attempt to question or appraise results. Controls are urgently needed, although obviously difficult to secure in programs aimed primarily at service. Olson (679) outlined what he considered to be a type of experimental approach to this problem.

Witmer (722) summarized the investigations of a number of persons on the success of treatment in various clinics. A scale from A to E has been used to describe the success of adjustment and percents are reported in terms of types of cases, clinics, and other characteristics of children. The material is difficult to express in brief space because of variations in treatment contacts, length of treatment, variations in intelligence, personality, type of behavior disorders, and parent attitudes. In the average situation apparently about 25 percent of the children show no improvement or deterioration, while something over 40 percent show definite improvement or complete disappearance of the problem.

A statistical study has been made of the success of foster home and reformatory school placement of neglected and delinquent children in Oslo, Norway (589). A number of selective factors appear to affect any practical deduction as to the optimum time for removing a child from his home or the relative efficacy of foster home versus institution placement. The test of success was the number of children convicted after being discharged. About one-third of the boys and only 5 percent of the girls had later convictions during the period of the study. Children removed earlier had fewer convictions than those removed later. Only about one-fifth of the boys who had been placed in families had later offenses as compared with one-half of the boys who were placed in reform school. As might be expected, the figures are dependent upon the seriousness of the case before the period of treatment. The success of clinic treatment is dependent upon the recommendations made and the extent to which they are carried out. In a follow-up study

Crowden (629) concluded that the ratio of success to failure is 7 to 3 if the recommendations are followed, 4 to 5 if partially followed, and only 2 to 8 if not followed. This internal analysis of the evidence is added weight for its acceptance as indicating beneficial results, even though selective factors are undoubtedly operative in the matter of carrying out recommendations.

The Child Guidance Institute in Bucharest reported complete cures for 17 percent of its cases, improvement for 50 percent, continued treatment for 30 percent, no improvement for 14 percent, and 24 percent discontinued (718).

Thom (712) reported improvement in 65 percent of the cases of preschool children treated in a habit clinic. About the same amount of improvement was noted immediately after discharge among adult patients from the Institute of Medical Psychology, London, with a drop to 55 percent after three years (667). States of anxiety and sexual difficulties were most responsive, and success seemed independent of the number of interviews.

The Bureau of Children's Guidance secured appraisals of treatment from parents and on the basis of staff judgment (658:40). The parental estimate was: success, 55 percent; partial success, 34 percent; and failure, 11 percent. Corresponding staff judgments were 48 percent, 31 percent, and 21 percent. An appreciable correlation existed between judgments on individuals by staff and parents.

Carberry (603) included a study of the consistency of judgment regarding the adjustment status in her follow-up of children examined by the California Bureau of Juvenile Research. The parents, teacher, local workers, and Bureau workers were asked to rate the present status of each child. A four-point scale of adjusted, partially adjusted, unimproved, and worse was utilized. Detailed figures on percent agreements were given. Differences in rating tendency indicate the desirability of using judges representing different areas of child contact. On the whole, about 20 percent of the children were regarded as adjusted, about double this number as partially adjusted, and the balance as unimproved or worse.

According to Davidson (610), the prospects of improvement through clinical guidance are improved when the child is young, bright, and in a school grade corresponding to his mental age.

Berk, Lane, and Tandy (592) reported that problems are reduced by about 50 percent in a follow-up of habit clinic children. Improvement is most obvious when the children are normal and superior in intelligence and when the home and agency are cooperative in carrying out recommendations.

The most comprehensive follow-up study of problem children treated through placement in foster families was made in connection with the work of Healy and others (632) of the Judge Baker Foundation. Their figures indicated 80 to 90 percent success in the cases of delinquent children or children with personality and habit problems when they are of normal mentality. These figures were reduced to 50 percent for the small

group of defectives and children with abnormal personalities. Considerable controversy has been caused by the report of the Gluecks (622) on the high percent of recidivism of juvenile court cases, even among those who had been referred to the Judge Baker Clinic. It has been pointed out in this connection, however, that the Clinic was primarily performing a diagnostic service for the court. The court was not equipped for a comprehensive treatment program. Clinically treated cases should be used as a test of the possibilities of the method.

A study by Foster and Anderson (616), in which 100 children were traced after a period of four years, showed that the disappearance of behavior problems is much more likely to occur in home situations which would be described as good.

J. Levy (662) made a year's study of thirty-six children referred to a clinic by schools. The clinic made recommendations concerning academic programs and the social work included parents as well as patients and teachers. Schools were cooperative and it is estimated that the cases treated showed 50 percent improvement.

It is of interest to note the regularity with which improvement is noted in from one-half to two-thirds of the children given intensive treatment. Improvement is particularly marked when the child is good human material, comes from a good home, and when treatment agencies secure cooperation. The picture is perhaps too hopeful for the skeptical scientist. Martens and Russ' study (669) is the only research contacted which has attempted to appraise the progress in a control group. To what extent do children show a reduction in problems with age irrespective of treatment? For what percent of a group of problem children referred on a complaint basis will improvement be noted without treatment when the precipitating circumstances concerned with referral have disappeared? The evidence from clinical judgment must be accepted as establishing a high probability that improvement over and above maturation occurs when treatment programs are instituted. In spite of the scientific difficulties involved in securing comparable controls and valid appraisal instruments, the effort should be made. At least two current programs are attempting such controls.

SUMMARY

Mental hygiene utilizes the generalizations from all fields dealing with human behavior in planning programs that will lead to a maximum of personal integration and social adjustment. It seeks positive mental health as well as the avoidance of overt failures of personal and social breakdown as manifested in mental illness or infractions of law. Mental hygiene is concerned with a field of unquestioned importance. Studies of methods, principles, and results increase in impressiveness. The obligation of the research worker is to seek to refine methods of investigation and to add to the body of verified conclusions. The evidence to date justifies the applied worker in areas of human relationship in adding some information and skill in mental hygiene to his professional armament.

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